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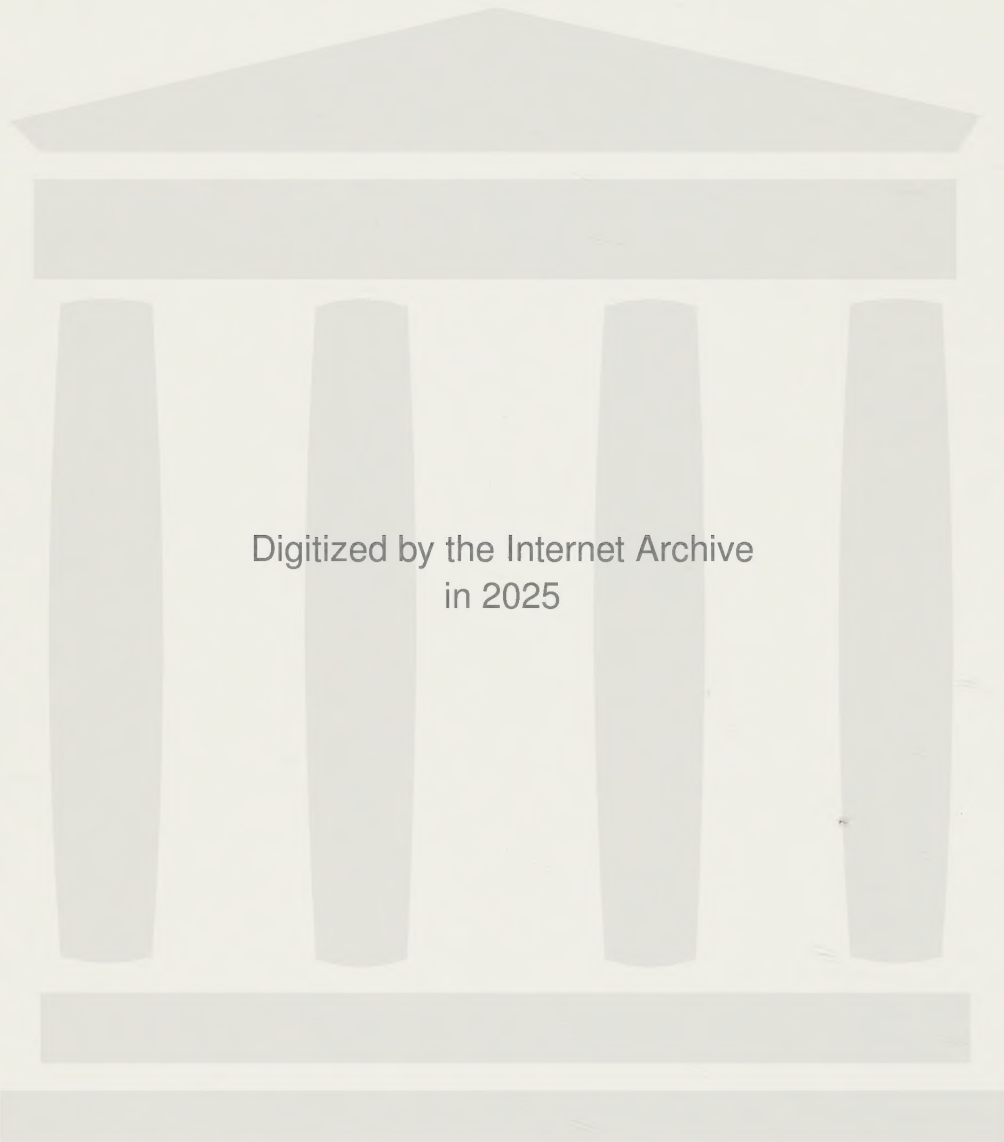
GRANT-IN-AID FOR FISHERIES Program Activities

1974



U.S.
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NATIONAL MARINE FISHERIES SERVICE
Robert W. Schoning, Director

GRANT-IN-AID FOR FISHERIES
PROGRAM ACTIVITIES
1974

Prepared by
Grant-in-Aid Staff

Washington, D. C.

July 1974

AUTHORIZATION

This report is submitted in compliance to the requirement of Section 9(a) of the Fish and Wildlife Act of 1956, as amended 16 U.S.C. 742d(7) and Section 2 of the Anadromous Fish Conservation Act of 1965, as amended 16 U.S.C. 757b.

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GRANT-IN-AID FOR FISHERIES

PROGRAM ACTIVITIES 1974

By
Grant-in-Aid Staff

INTRODUCTION

This is the seventh of a series of annual publications on program activities under the Grant-in-Aid for fisheries program of the Office of State-Federal Relationships, National Marine Fisheries Service.

Information presented in this report is intended to provide State program coordinators and administrators, Federal people, project personnel, and others concerned with research, development, conservation, and management of our fishery resources with a convenient reference to this grant-in-aid program. This publication will also facilitate planning, coordination, and integration of State, Federal, and other activities concerned with the fishery resources.

THE ACTS

The Service's Grant-in-Aid Program is authorized under two Acts:

1. The Commercial Fisheries Research and Development Act of 1964 (P.L. 88-309) as amended - Authorizes the Secretary of Commerce to cooperate with the 50 States, the Commonwealth of Puerto Rico, and the Governments of the Virgin Islands, Guam, and American Samoa in carrying out research and development of the Nation's commercial fisheries. Projects eligible for funding include research, development, construction, and coordination. Cost-sharing projects are funded at either a 50 percent or 75 percent level of Federal participation, whereas projects to alleviate resource disaster and for establishment of new commercial fisheries may be financed with 100 percent Federal funds. This Act would have expired June 30, 1973; however, it was extended by Public Law 92-590 for an additional 5 years or to June 30, 1978.

2. The Anadromous Fish Act of 1965 (P.L. 89-304) as amended - Authorizes the Secretary of Commerce to enter into cooperative agreements with States and other non-Federal interests for the conservation, development, and enhancement of the anadromous fishery resources of the Nation and the fish in the Great Lakes that ascend streams to spawn and for the control of the sea lamprey in the Great Lakes. The program is administered at the Federal level jointly by the National Marine Fisheries Service and the U.S. Fish and Wildlife Service. Federal funds up to 50 percent may be used to finance project costs. State fishery agencies, colleges, universities, private companies, and other non-Federal interests in 31 States bordering the oceans and the Great Lakes may participate under the Act. All projects must be approved by the State fishery agency concerned. This Act would have expired June 30, 1974; however, it was extended for an additional 5 years or to June 30, 1979. The new law authorizes \$20 million per year. Appropriated funds are available to the program until expended. The new law also provides that the Federal share of the project cost may be increased to a maximum 66-2/3 percent when two or more States, having a common interest in any basin, jointly enter into a cooperative agreement with the Secretary.

APPORTIONMENT OF FEDERAL FUNDS BY STATE AND AUTHORIZATION

Distribution of Federal funds in the amount of \$54,591,600 to the States and others under the National Marine Fisheries Service grant-in-aid for fisheries program in fiscal year 1974 and accumulative totals under each authorization since enactment of the legislation in fiscal year 1966 are given in the following tabulation:

State and others	Fiscal Year 1974		Cumulative Total		Grand Total
	P.L. 88-309	P.L. 89-304	P.L. 88-309	P.L. 89-304	
Alabama	\$ 327,000	\$ 41,500	\$ 851,700	\$ 191,025	\$1,042,725
Alaska	228,000	421,850	2,124,000	3,148,050	5,272,050
Arizona	19,000	0	177,000	0	177,000
Arkansas	33,900	0	238,700	0	238,700
California	228,000	275,000	2,124,000	2,225,000	4,349,000
Colorado	19,000	0	177,000	0	177,000
Connecticut	19,000	19,200	377,000	141,450	518,450
Delaware	19,000	1,500	233,500	82,825	316,325
Florida	228,000	0	2,339,000	106,400	2,445,400
Georgia	87,000	0	876,800	50,500	927,300
Hawaii	30,500	0	278,000	0	278,000
Idaho	19,000	0	177,000	0	177,000
Illinois	19,000	0	189,300	20,500	209,800
Indiana	19,000	0	177,000	0	177,000
Iowa	19,000	0	177,000	0	177,000
Kansas	19,000	0	177,000	0	177,000
Kentucky	19,000	0	177,000	0	177,000
Louisiana	503,000	0	2,675,388	85,000	2,760,388
Maine	161,800	44,000	1,675,500	264,400	1,939,900
Maryland	457,300	63,150	1,796,700	473,950	2,270,650
Massachusetts	228,000	49,300	2,324,000	180,300	2,504,300
Michigan	19,000	35,000	647,900	235,000	882,900
Minnesota	19,000	0	177,000	23,000	200,000
Mississippi	256,000	17,500	1,198,700	137,500	1,336,200
Missouri	23,600	0	192,100	0	192,100
Montana	19,000	0	177,000	0	177,000
Nebraska	19,000	0	177,000	0	177,000
Nevada	19,000	0	177,000	0	177,000
New Hampshire	32,700	10,000	203,000	560,000	763,000
New Jersey	103,800	15,000	1,212,400	132,500	1,344,900
New Mexico	19,000	0	177,000	0	177,000
New York	148,300	30,000	1,486,400	129,000	1,615,400
North Carolina	48,200	83,500	578,700	375,625	954,325
North Dakota	19,000	0	177,000	0	177,000
Ohio	43,200	0	437,200	95,500	532,700
Oklahoma	19,000	0	177,000	0	177,000
Oregon	128,400	358,950	1,165,200	2,795,825	3,961,025
Pennsylvania	88,100	1,000	573,000	74,250	647,250
Rhode Island	30,900	20,000	235,400	145,000	380,400
South Carolina	34,200	20,500	280,700	128,500	409,200
South Dakota	19,000	0	177,000	0	177,000
Tennessee	19,000	0	177,000	0	177,000
Texas	228,000	0	2,129,568	0	2,129,568
Utah	19,000	0	177,000	0	177,000
Vermont	19,000	0	177,000	0	177,000
Virginia	623,700	90,000	1,946,044	643,000	2,589,044
Washington	158,100	400,050	1,666,300	3,169,200	4,835,500
West Virginia	19,000	0	177,000	0	177,000
Wisconsin	24,200	3,000	188,600	128,700	317,300
Wyoming	19,000	0	177,000	0	177,000
American Samoa	94,700	0	699,200	0	699,200
Guam	19,000	0	177,000	0	177,000
Puerto Rico	228,000	0	2,011,600	0	2,011,600
Virgin Islands	19,000	0	177,000	0	177,000
TOTAL	\$5,300,600	\$2,000,000	\$38,849,600	\$15,742,000	\$54,591,600*

*Does not include \$820,764 apportioned to the States under P.L. 89-720, which is currently inactive.

CLASSIFICATION OF FEDERAL FUNDS
BY ACTIVITY AND AUTHORIZATION
FY 1966 - FY 1974

Program activities cover various fields, including a broad category of research, construction, development, coordination, and resource disasters. Fifty-three percent of the Federal funds are used for research in such areas as fish disease and parasite control, aquaculture, the environment, basic biology, and life history. More than 16 percent is for construction of research vessels and laboratories, fish hatcheries, fish screens and other fish facilities; nearly 18 percent for exploratory fishing, gear development, fish products, economics, and other development projects; 7 percent for coordination and planning; and more than 6 percent for resource disasters.

Activity	Public Laws		Totals	
	88-309 (\$1,000)	89-304 (\$1,000)	Dollars (\$1,000)	Percent (Total)
Construction	2,576	6,347	8,923	16.3
Fish culture facilities	112	110		
Fish landing facilities	322	0		
Fish screens and fishways	0	1,747		
Stream improvement	21	686		
Hatcheries	144	3,732		
Laboratories	1,534	72		
Research Vessels	443			
Coordination	1,705	266	1,971	3.6
Development	8,645	949	9,594	17.6
Economics	100	0		
Exploratory fishing	1,661	150		
Extension	1,140	0		
Fishery products	1,257	0		
Marketing	3,110	0		
Operation and maintenance	124	703		
Statistics	1,253	96		
Planning	1,544	281	1,825	3.3
Research	21,017	7,899	28,916	53.0
Aquaculture	2,182	72		
Disease and parasites	1,208	215		
Environment	2,255	108		
Finfish	7,807	7,504		
Marine worms	235	0		
Shellfish	7,330	0		
Resource disaster	3,363	0	3,363	6.2
TOTAL	38,850	15,742	54,592	100.0

PROJECT TITLES BY STATE AND PUBLIC LAW
WITH OTHER PERTINENT INFORMATION

All 50 States, the Commonwealth of Puerto Rico, and the Governments of American Samoa, Guam, and the Virgin Islands are participating in the program under one or more of the authorizations. Since the start of the program, 809 projects have been initiated at an estimated total cost (both State and Federal) of more than \$93 million. Of the projects initiated, 622 have been completed at a total cost of nearly \$63 million, and 187 are continuing at various stages of completion at an estimated total cost of more than \$29 million. The average Federal share of project cost is about 67 percent.

Tabulation of completed and continuing projects, including total cost, follows:

Public Law	Completed projects		Continued projects		Total projects	
	Number	Total cost \$1,000	Number	Total cost \$1,000	Number	Total cost \$1,000
88-309	456	39,498	146	19,275	602	58,773
89-304	166	24,232	41	10,110	207	34,342
TOTAL	622	63,730	187	29,385	809	93,115

A list of on-going projects and those completed since 1970, under each authorization by State, including duration, date completed, and page reference for project narrative, is tabulated pages 5 through 4. Under Public Law 88-309, project numbers identify the Region administering the project by the first digit, project number sequence within the Region by next digit(s), followed by a letter to denote activity as R-research, C-construction, D-development, and S-coordination and planning, and 4(b) when funded with resource disaster funds. Under Public Law 89-304, the first two letters "AF" identify the project as anadromous fish, with next letter "C" for projects administered by NMFS, or "CS" for jointly funded projects with BSF&W with NMFS as lead agency, and "SC" for jointly funded projects with BSF&W as lead agency, followed by number sequence within each State.

Public Law	Project number and title	Date initiated <u>Year</u>	Dura- tion <u>Years</u>	Estimated total cost <u>Dollars</u>	Date com- pleted <u>Year</u>	Project narra- tive <u>Page</u>
88-309	<u>ALABAMA</u>					
	2-86-R. Experiments in the culture of marine species in floating baskets	1969	4	92,200	1973	29
	2-119-R. A survey of the benthic organisms in coastal streams and brackish waters of Alabama	1970	1	12,100	1971	50
	2-120-R. Distribution of commercial fishes and invertebrates in the tidal rivers of Alabama	1970	3	50,000	1973	68
	2-141-R. Publication and reproduction of research reports	1971	3	34,000	1974	42
	2-143-R. Evaluation and planning of Alabama's marine resources research and development requirements	1971	1	7,830	1971	48
	2-149-R. The circulation and tidal flushing of Alabama's estuaries and the effect of shell dredging on suspended solids	1971	2	61,000	1973	50
	2-165-D(4b). Restoration of an oyster resource destroyed by natural causes	1972	1	70,000	1972	78
	2-201-R. Study of oyster reef cultivation and artificially inducing crab molting	1973	1	25,000		77
	2-203-R. Experiments in overwintering Florida pompano and winter culture of rainbow trout	1973	2	40,000		29
	2-207-R. Regulation of coastal zone development for fisheries management	1973	3	45,000		49
	2-208-R. Survey of the 16-foot trawl fishery in Alabama	1973	2	25,000		75
	2-211-D(4b). Restoration of oyster resources lost in a natural disaster	1973	1	261,016		78
	2-216-R. Preparing data on oyster fishery, dredging and geology for publication	1973	1	20,000		42
	2-229-R. Distribution, publication, and reproduction of research reports	1974	3	30,000		42
	2-238-R. Analysis of commercial fisheries catch for Alabama	1974	1	8,000		78
89-304	AFC-3. Striped bass, <u>Morone saxatilis</u> , production to establish commercial stocks in Alabama estuaries	1970	3	79,600	1973	67
	AFC-5. Construction of an anadromous fish hatchery and rearing facility	1971	3	253,200	1973	35
	AFC-6. Striped bass production and stocking experiments in Alabama coastal areas	1973	3	120,000		67

(continued)

Public Law	Project number and title	Date initiated <u>Year</u>	Dura- tion <u>Years</u>	Estimated total cost <u>Dollars</u>	Date com- pleted <u>Year</u>	Project narra- tive <u>Page</u>
	AFC-7. Factors limiting the survival and growth of early life history stage of the striped bass (<u>Morone saxatilis</u>)	1973	3	147,000		67
	AFC-8. Installation of heating/cooling system in hatchery building	1973	1	3,000		35
88-309	<u>ALASKA</u>					
	5-17-R. Pink salmon studies	1969	2	116,500	1971	61
	5-18-R. Sockeye salmon investigations	1969	2	107,700	1971	61
	5-23-R. Sea scallop investigations	1969	3	99,000	1972	75
	5-25-R. Pandalid shrimp studies	1972	1	92,400	1973	75
	5-27-D. Alaska commercial fishery statistics	1972	1	18,400	1973	78
	5-28-R. Relationships between logging activities and salmon production	1972	1	73,600	1973	52
	5-29-R. Cook Inlet shellfish investigations	1972	1	28,100	1973	75
	5-30-R. King crab study	1972	1	55,700	1973	71
	5-31-R. Study of land-use salmon problems and planning in Southeastern Alaska	1973	3	216,000		61
	5-32-R. Cook Inlet king and tanner crab investigations	1973	3	100,000		71
	5-33-S. Program coordination	1973	3	140,000		38
	5-34-D. Commercial fisheries statistical systems development	1973	3	64,000		79
	5-35-R. Kodiak tanner crab research	1973	3	147,300		71
	5-36-R. Kodiak pandalid shrimp research	1973	3	277,200		76
89-304	AFC-24. Offshore test fishing - Southeastern Alaska	1970	1	107,800	1971	61
	AFC-25. Sonic assessment of salmon escapements	1970	1	4,000	1971	62
	AFC-26. Yukon River anadromous fish investigations	1970	3	318,000	1973	62
	AFC-27. Kodiak sockeye rehabilitation	1970	2	212,000	1972	62
	AFC-28. Alaska Peninsula pink salmon forecast	1970	3	111,300	1973	62
	AFC-29. Sockeye salmon studies, Southeastern Alaska	1970	1	62,800	1971	62
	AFC-30. Stream rehabilitation, Prince William Sound	1970	3	438,900		52
	AFC-31. Bristol Bay test fishing program	1970	3	114,800	1973	62
	AFC-32. Identification and enumeration of Copper River sockeye salmon stocks	1970	3	318,000	1972	62

(continued)

Public Law	Project number and title	Date initi- ated	Dura- tion	Estimated total cost	Date com- pleted	Project narra- tive
		Year	Years	Dollars	Year	Page
	AFC-33. Sockeye smolt enumeration study	1970	2	147,200	1972	62
	AFC-34. Species interrelationships in Chignik Lakes	1970	3	101,100	1973	62
	AFC-35. Carrying capacity of the sockeye salmon nursery areas in the Kvichak district, Bristol Bay, Alaska	1970	1	50,000	1971	62
	AFC-36. Coordination and planning	1970	3	279,600	1973	38
	AFC-40. Southeastern Alaska sockeye salmon optimum escapement studies	1971	3	208,600	1974	63
	AFC-41. Cook Inlet sockeye forecast and optimum escapement studies	1971	3	364,000	1974	63
	AFC-42. Alevin abundance - pink salmon prediction studies	1971	3	450,000	1974	63
	AFC-43. Norton Sound anadromous fish investigations	1972	2	87,000	1974	63
	AFC-44. Systems modeling of sockeye salmon in the Wood River Lakes	1972	3	38,000		63
	AFC-46. Copper River commercial fisheries management investigations	1973	1	111,200		63
	AFC-47. Yukon River king and chum salmon escapement studies	1973	1	100,800		63
	AFC-48. Chignik sockeye studies	1973	1	28,650		63
	AFC-49. Marked salmon recovery program	1974	3	160,000		63
88-309	<u>AMERICAN SAMOA</u>					
	H-15-D. Development of pole and line skipjack tuna fishery in American Samoa	1970	3	242,250	1972	41
	H-16-C. Acquisition of multi-purpose research vessel	1970	1	85,000	1971	37
	H-17-D. Acquisition of a prototype demonstration fishing vessel for American Samoa	1970	1	10,000	1972	38
	H-18-D. Statistical analysis of American Samoa's fisheries	1971	3	28,000	1972	79
	4-21-D. Development of natural and captive baitfish stocks	1972	3	75,000		60
	4-22-D. Further studies of the near-shore tuna resources of American Samoa	1972	3	365,000		68
	4-26-D. Statistical analysis of American Samoa fisheries 1974-1976	1973	3	42,000		79
88-309	<u>ARIZONA</u>					
	6-11-R. Commercial fisheries potential of reservoirs	1969	3	76,240	1972	54

(continued)

Public Law	Project number and title	Date initiated	Dura- tion	Estimated total cost	Date com- pleted	Project narra- tive
		Year	Years	Dollars	Year	Page
	4-19-R. Influence of pump storage and generation on commercial fisheries potential of reservoirs	1972	3	74,211		53
88-309	<u>ARKANSAS</u>					
	4-12-D. Commercial fisheries industry survey	1966	5	49,060	1971	49
	4-53-R. Influence of temperature and photoperiod on growth, food consumption, and food conversion efficiency of blue catfish, <u>Ictalurus furcatus</u> (Lesueur)	1969	2	28,000	1971	54
	4-67-D. Cage culture of fish in reservoirs	1970	1	21,420	1971	29
	2-133-R. Culturing of trout in cages	1970	1	5,400	1971	29
	2-148-R. Efficacy of prophylactic treatments on caged catfish and investigations of cage construction material	1971	1	12,820	1972	29
	2-157-D. Commercial fishery industry survey	1971	3	43,500	1974	79
	2-162-R. Effects of quality and quantity of food on golden shiner production	1971	3	50,000	1973	53
	2-166-R. Effects of cage culture fish production upon the biotic and abiotic environment of Crystal Lake	1971	3	81,900		52
88-309	<u>CALIFORNIA</u>					
	6-3-R. Fisheries resources sea survey	1966	8	1,269,000	1974	68
	6-4-R. Shellfish laboratory operations	1966	6	738,300	1972	29
	6-12-C. Shellfish laboratory - water construction and electrical power installation	1970	1	32,000	1971	33
	6-12-D. Shellfish and bottom fish data analysis	1970	3	255,000	1973	79
	6-16-S. Coordination of Public Law 88-309	1971	3	120,000		38
	6-16-R. Food habits study of organisms of the California current system	1971	1	5,000	1972	68
	4-20-R. Mariculture research and development	1972	3	184,400		30
	4-25-D. Commercial fisheries biometrical analysis	1973	3	206,400		79
	4-28-R. Assessment of commercial fisheries resources	1974	3	384,900		68

(continued)

Public Law	Project number and title	Date initiated	Dura- tion	Estimated total cost	Date com- pleted	Project narra- tive
		<u>Year</u>	<u>Years</u>	<u>Dollars</u>	<u>Year</u>	<u>Page</u>
89-304	AFSC-1. Mad River hatchery construction	1967	4	2,684,250	1972	35
	AFC-3. Mad River hatchery fish ladder construction	1967	4	40,000	1971	35
	AFC-9. Banta-Carbona fish screen construction	1968	3	225,000	1971	33
	AFSC-10. Glenn-Colusa fish screen construction	1968	4	2,540,000	1973	33
	AFC-11. El Solyo fish screen	1970	1	90,000	1971	34
	AFC-12. Ocean salmon study	1972	5	489,800		64
	AFC-14. Enhancement of anadromous fisheries resources	1974	5	2,750,000		49
	AFSC-15. Mad River fish hatchery operations	1972	3	888,800		47
	AFC-16. Fish screen and ladder operation and maintenance--Lower Sacramento and San Joaquin area	1974	5	800,000		48
	<u>COLORADO</u>					
88-309	6-11-D. Culture of fishes with commercial importance	1970	3	87,000	1973	30
	1-100-R. Culture, survival, and economics of commercially important game fish	1973	4	103,500		57
	<u>CONNECTICUT</u>					
88-309	3-130-R. Ecology, population structure, and movements of lobster	1970	3	74,400	1973	72
	3-203-R. Lobster investigations	1974	3	74,400		72
89-304	AFC-6. A study of the migratory behavior of American shad	1970	3	66,000	1973	60
	AFC-7. Estimating the number of river herring in the Connecticut River	1970	3	53,200	1973	59
	AFC-8. A study of the weight loss in American shad during the freshwater migration	1972	3	27,000		60
	<u>DELAWARE</u>					
88-309	3-135-R. Hard clam survey of Delaware Bay	1970	3	60,000	1973	70
	3-142-R. Live oyster bed and cultch survey of Delaware Bay and tributaries	1971	3	54,000	1974	73
	3-216-D. Technical assistance to commercial fishermen	1974	3	60,000		42
89-304	AFSC-3. Shad passageway construction on the Brandywine River	1968	4	120,000	1972	34

(continued)

Public Law	Project number and title	Date initiated <u>Year</u>	Dura- tion <u>Years</u>	Estimated total cost <u>Dollars</u>	Date com- pleted <u>Year</u>	Project narra- tive <u>Page</u>
	AFSC-4. Restoration of shad runs in the Brandywine Creek and its tributaries	1971	5	177,825		34
88-309	<u>FLORIDA</u>					
	2-52-D. Construction of artificial oyster reefs	1967	4	175,090	1971	73
	2-113-R. Development of specialized mari-culture techniques on species of high potential	1970	3	206,000	1973	30
	2-125-D. Fisheries marketing and extension service	1970	1	213,100	1971	46
	2-126-D. Fisheries technical assistance	1970	1	34,870	1971	43
	2-134-R. Exploratory clam survey of estuarine and nearshore waters of Florida	1970	2	118,100	1972	70
	2-150-D. Artificial oyster reef development	1971	3	150,000	1974	74
	2-152-D. Fisheries extension service (home economics)	1971	1	141,577	1972	43
	2-167-D(4b). Reestablishment of destroyed oyster reefs	1972	1	113,100	1973	78
	2-177-D. National molluscan film	1972	1	4,000	1973	43
	2-185-R. Rock shrimp life history studies and exploratory fishing survey	1972	2	140,000		76
	2-191-D. Fisheries extension and marketing	1972	3	424,731		46
89-304	2-206-R. Mass culture of freshwater shrimp for commercial evaluation	1973	3	72,000		30
	AFC-2. Investigation on the American shad in the St. Johns River	1968	3	94,240	1971	60
	AFCS-5. Study of anadromous fishes of Florida	1971	3	228,000	1974	68
88-309	<u>GEORGIA</u>					
	2-84-R. A study of the nutritional, physiological, and economic requirements for the production of channel catfish in an intensive running water culture	1969	3	105,000	1972	30
	2-87-R. Preliminary studies of a potential finfish industry from commercial shrimp landings	1969	3	39,310	1971	76
	2-116-R. Studies on the ecology of Georgia's estuarine waters	1970	3	379,640	1974	51
	2-117-R. Catfish fingerling production under intensive running water conditions	1970	1	10,000	1971	30
	2-172-R. The requirements of the catfish for several nutritional and physiological variables	1972	2	78,750	1974	30

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Public Law	Project number and title	Date initiated Year	Dura- tion Years	Estimated total cost Dollars	Date com- pleted Year	Project narra- tive Page
	2-205-S. Coordination of P.L. 88-309	1973	3	61,500		38
88-309	<u>GUAM</u> H-12-D. Development of Guam's commercial fisheries potentials	1969	3	120,000	1972	43
	4-23-D. The aquaculture potential of Guam	1972	3	96,000		30
88-309	<u>HAWAII</u> H-13-R. Commercial oyster fishery development investigations	1969	3	65,800	1972	74
	H-14-D. Development of a prawn culture industry	1969	3	135,375	1972	30
	4-24-D. Development of a prawn culture industry in Hawaii	1972	3	156,000		30
88-309	<u>IDAHO</u> 1-51-C. Construction of Hayden Creek rearing ponds	1969	2	30,200	1971	35
	1-57-D. Test rearing of anadromous fish, Lemhi River drainage	1970	4	89,300	1974	31
88-309	<u>ILLINOIS</u> 4-50-R. Significance of ionic content of water in determining the growth and handling quality of channel catfish	1969	3	51,120	1972	54
	4-51-R. Considerations in the commercial production of channel catfish in cages	1969	2	25,380	1971	31
	3-165-R. Stabilization of environmental conditions in fish production ponds	1973	2	41,871		31
89-304	AFC-2. Histology of the thyroid and pituitary glands in the alewife	1970	2	33,000	1972	59
88-309	<u>INDIANA</u> 4-43-R. Interspecies relationships of fish in Indiana waters of Lake Michigan (See 3-150-R)	1968	3	36,000	1971	64
	3-150-R. Interspecies relationships of fish in Indiana waters of Lake Michigan	1971	3	75,600	1974	57
88-309	<u>IOWA</u> 4-11-R. Industrial and commercial food fish investigations	1966	6	161,000	1972	57
	2-156-R. Shovelnose sturgeon investiga- tions	1971	3	30,000	1974	68
	2-178-R. Channel catfish investigations	1972	3	55,840		55
	2-225-R. Northern pike investigations	1974	3	37,000		56
88-309	<u>KANSAS</u> 4-45-R. Investigations on nutrition and metabolism of catfish and utilization of fisheries products	1969	3	84,000	1971	55

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Public Law	Project number and title	Date initiated Year	Dura- tion Years	Estimated total cost Dollars	Date com- pleted Year	Project narra- tive Page
	2-170-R. Investigations on nutrition and metabolism of the channel catfish	1972	3	84,000		55
88-309	<u>KENTUCKY</u> 4-48-R. Influences of the effluent from a concentrated industrial complex on a large river	1969	2	60,000	1971	53
	4-70-R. Kentucky Lake commercial catfish catch analysis	1970	2	9,000	1972	55
	2-171-R. Commercial fishing investigations of Nolin and Rough River Reservoirs	1972	2	10,700	1974	79
	2-186-R. Commercial fishery investigations of the Kentucky River	1972	2	69,000	1974	57
	2-227-R. Commercial fisheries gear evaluation	1974	1	12,000		41
	2-228-R. Population dynamics and catch susceptibility of smallmouth buffalo in Rough River reservoir	1974	2	20,600		54
88-309	<u>LOUISIANA</u> 2-72-R. Evaluation of experimental oyster tonging reefs in Calcasieu Lake	1969	3	45,000	1971	74
	2-90-R. Experiments to reestablish historical oyster seed grounds and to control the Southern oyster drill	1969	3	102,000	1972	74
	2-91-R. A study of the clam, <u>Rangia cuneata</u> , in Lake Pontchartrain and Lake Maurepas	1969	3	107,000	1972	71
	2-92-R. A study of the blue crab fishery in Louisiana	1969	3	97,000	1972	71
	2-93-R. Investigations of commercially important penaeid shrimp in Louisiana's estuaries	1969	3	170,000	1972	76
	2-94-R. A study of commercially important estuarine-dependent industrial fishes	1969	3	86,000	1972	69
	2-118-D. Control monuments for oyster leases	1970	3	280,000	1973	74
	2-168-R. An inventory and study of the Vermilion Bay-Atchafalaya Bay estuarine complex	1972	3	140,000		51
	2-188-R. An inventory and study of the Lake Pontchartrain-Lake Maurepas estuarine complex	1972	3	130,000		51
	2-189-R. A study of the fauna in dredged canals of coastal Louisiana	1972	3	140,000		51
	2-190-R. Development of an areal management concept for Gulf penaeid shrimp	1972	4	270,000		49

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Public Law	Project number and title	Date initiated	Dura- tion	Estimated total cost	Date com- pleted	Project narra- tive
		Year	Years	Dollars	Year	Page
	2-209-D. Survey stations for oyster leases	1973	3	300,000		74
	2-212-S. Coordination	1966	10	192,730		38
	2-213-D(4b). Rehabilitation of natural oyster seed grounds destroyed by a natural disaster	1973	1	275,000		78
	<u>MAINE</u>					
88-309	3-13-D. Maine marine fisheries extension service	1966	7	176,000	1973	43
	3-14-R. Lobster research program	1966	5	309,600	1971	72
	3-16-R. Biological, environmental, and technological research on marine worms	1965	6	234,000	1971	70
	3-115-D. Market development	1970	3	131,100	1973	46
	3-117-R. Northern shrimp - assessment of some population parameters	1970	3	96,000	1973	76
	FWAC-2. Statewide comprehensive fish wildlife, and marine management plan	1969	5	48,116		49
	3-153-R. Lobster research program	1971	4	216,000		72
	3-158-R. Marine worm research	1972	3	117,000		70
	3-170-R. Escalator dredge study	1972	2	42,000		51
	3-176-D. Market development	1973	3	150,000		47
	3-177-D. Marine resources extension service	1973	3	100,000		43
	3-183-S. Coordination of research and development projects	1973	3	151,000		38
	3-189-R. <u>Pandalus borealis</u> management modeling	1973	3	55,850		76
	3-201-D. Operation and maintenance of marine laboratory, West Boothbay Harbor, Maine	1973	3	69,000		48
	3-202-R. Environmental physiology of commercial shrimp (<u>Pandalus borealis</u>)	1973	3	90,000		76
	3-205-R. Benthos study of the Sheepscot River estuary	1974	2	30,400		51
89-304	AF6-6. Stream improvement and fishway construction	1968	4	100,000	1972	34
	AFCS-9. Phase II, marine research laboratory construction	1970	2	200,000	1972	37
	AFSC-13. Statewide comprehensive fish, wildlife, and marine management plan	1969	2	42,412	1972	49

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Public Law	Project number and title	Date initiated	Duration Years	Estimated total cost	Date completed	Project narrative
		Year		Dollars	Year	Page
	AFC-14. Development and management of alewife, blueback, and shad resources	1969	4	125,000	1973	59
	AFC-15. Fishway construction and stream improvement	1971	3	180,000	1974	34
	AFC-16. Population, biology, and management of the alewife, <u>Alosa pseudoharengus</u> , in Maine	1973	3	91,500		59
	<u>MARYLAND</u>					
88-309	3-66-D. Market development for Chesapeake Bay seafoods	1967	3	493,800	1971	47
	3-75-R. Development of disease-resistant oysters (<u>C. virginica</u>) under field conditions in lower Chesapeake Bay	1967	3	97,500	1971	39
	3-93-R. The effects of the Maryland hydraulic clam dredge on populations of the softshell clam	1969	3	50,000	1971	51
	3-108-R. Blue crab study in Chesapeake Bay	1969	3	240,000	1973	71
	3-126-D. Seafood extension service	1970	3	81,000	1973	48
	3-129-D. Oyster processing study	1970	1	40,726	1971	44
	3-131-R. Molluscan mortality studies	1970	3	111,906	1973	39
	3-132-D. Maryland seafood marketing	1970	3	369,340	1973	47
	3-144-D. National molluscan film	1970	2	8,000	1972	43
	3-152-D. Engineering principles as applied to oyster processing problems	1971	2	104,000	1973	45
	3-184-D. Maryland seafood marketing	1973	3	236,550		47
	3-186-R. Factors influencing blue crab population size: Nutrition of larvae and migration of juveniles	1973	3	150,800		72
	3-188-R. Marine animal disease investigations	1973	3	121,276		39
	3-190-D. Fisheries extension service	1973	3	128,832		43
	3-214-D(4b). Emergency oyster repletion program	1973	1	300,000		78
89-304	AFC-5. Suspended sediments in Chesapeake Bay	1970	1	85,000	1971	51
	AFC-6. Coordination service	1970	1	13,000	1971	38
	AFC-8. Survey of anadromous fish spawning areas	1970	3	423,700		57
	<u>MASSACHUSETTS</u>					
88-309	3-37-D. Collection, compilation, evaluation, and dissemination of commercial fisheries statistics	1966	7	134,945	1973	79
	3-60-D. Shellfish technical assistance	1969	4	86,820	1972	44

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Public Law	Project number and title	Date initi- ated	Dura- tion	Estimated total cost	Date com- pleted	Project narra- tive
		<u>Year*</u>	<u>Years</u>	<u>Dollars</u>	<u>Year</u>	<u>Page</u>
	3-74-C. Marine research laboratory construction	1968	4	400,000	1972	37
	3-87-R. Winter flounder investigations	1969	5	123,500		60
	3-109-D. Massachusetts commercial fisheries extension service	1969	4	200,000	1974	44
	3-192-S. Coordination	1972	3	156,950		38
	3-136-D. Massachusetts fisheries marketing program	1970	3	299,199	1973	47
	3-178-D. Shellfish technical assistance	1973	4	94,000		44
	3-194-D. Collection, compilation, evaluation and dissemination of commercial fisheries statistics	1973	5	203,300		79
	3-199-D. Massachusetts fisheries marketing program	1973	3	297,000		47
	3-204-R. Fishery resource assessment: winter flounder and other species	1974	4	148,000		61
	3-207-D. Massachusetts commercial fisheries extension service	1974	4	205,000		44
89-304	AFCS-9. Anadromous fisheries development	1970	4	257,000	1974	34
	AFC-12. Biological assessment of the alewife population, Parker River, Massachusetts	1972	3	33,000		59
	AFC-13. Hatchery modifications for hatching and rearing Atlantic salmon	1972	2	100,000	1974	35
	AFC-14. Anadromous fisheries management	1974	5	92,250		34
<u>MICHIGAN</u>						
88-309	4-59-R. Lake trout restoration studies	1969	3	143,000	1972	56
	3-168-R. Assessment of 1972 lake trout populations in Lake Michigan	1972	3	120,000		56
89-304	AFSC-8. Great Lakes fish resource development study	1968	3	120,000	1971	49
	AFC-9. Parasites and diseases of anadromous and commercial fish	1970	3	271,368	1973	39
<u>MINNESOTA</u>						
88-309	4-38-R. Lake Superior commercial fisheries assessment studies	1968	3	37,500	1971	56
	4-39-R. Minnesota commercial fisheries improvement - Lake of the Woods	1968	4	105,978	1971	57
	3-143-R. Factors determining the relationships of the burbot to other associated species in Minnesota waters	1971	3	41,639	1973	58

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Public Law	Project number and title	Date initiated <u>Year</u>	Dura- tion <u>Years</u>	Estimated total cost <u>Dollars</u>	Date com- pleted <u>Year</u>	Project narra- tive <u>Page</u>
	3-151-R. Lake Superior commercial fisheries assessment studies	1971	3	45,000		56
88-309	<u>MISSISSIPPI</u> 2-85-R. A study of the parasites and diseases of fish, mollusk, and crustacea utilized in mariculture	1969	3	120,000	1972	39
	2-123-R. A study of the blue crab fishery in Mississippi	1970	3	94,500	1973	71
	2-124-R. Investigation of commercially important penaeid shrimp in Mississippi estuaries	1970	3	110,400	1973	76
	2-128-R. Investigations of coastal pelagic fishes	1970	3	93,000	1973	69
	2-174-R. Parasites, diseases, and control of diseases of commercially important finfish and shellfish	1972	3	125,000		39
	2-214-D(4b). Reestablish oyster reefs destroyed by flood waters	1973	1	160,000		78
	2-215-R. Fisheries resources assessment and monitoring	1973	3	240,000		69
	2-217-R. Statistics on subsistence fishing in coastal counties	1974	3	36,646		80
89-304	AFCS-4. Experimental stocking of striped bass	1970	3	210,000	1973	68
	AFCS-5. Striped bass rearing and stocking program	1973	3	210,000		68
88-309	<u>MISSOURI</u> 4-3-R. Research and management of commercial fisheries	1966	6	151,557	1972	80
	4-66-R. Transmission of an ovary parasite of the golden shiner	1970	1	4,313	1971	39
	2-131-D. Equipping fish disease laboratory	1970	1	5,403	1971	40
	2-164-R. Influence of light intensity on food conversion of channel catfish	1971	1	4,807	1972	55
	2-187-R. Anatomical and histological description of the channel catfish (<u>Ictalurus punctatus</u>)	1972	3	26,000		55
	2-199-R. Research and management of Missouri's commercial fisheries resources	1973	3	100,000		80
88-309	<u>MONTANA</u> 1-56-D. Commercial fishery of Fort Peck Reservoir	1970	3	75,900	1973	58
88-309	<u>NEBRASKA</u> 4-57-R. Commercial fishery investigations	1969	3	88,000	1972	58

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Public Law	Project number and title	Date initiated <u>Year</u>	Dura- tion <u>Years</u>	Estimated total cost <u>Dollars</u>	Date com- pleted <u>Year</u>	Project narra- tive <u>Page</u>
	2-195-R. Survey of the commercial fisheries industry of Nebraska	1972	1	11,333	1973	80
	2-196-R. Evaluation of an electric weir as a harvest method for commercial fish	1972	1	12,000	1973	58
	2-223-R. Commercial fisheries statistics	1974	3	31,100		80
	2-226-R. Inland commercial fisheries harvest	1974	3	54,275		58
<u>NEVADA</u>						
88-309	6-9-D. Rearing bait fishes in the desert southwest	1968	5	166,229		53
<u>NEW HAMPSHIRE</u>						
88-309	3-105-R. A comparative study of conventional and experimental inshore lobster gear	1969	2	40,650	1971	41
	3-122-D. Acquisition of marine workboat	1970	1	20,000	1971	38
	3-146-D. National molluscan film	1971	1	4,000	1972	43
	3-155-R. Lobster research program	1971	3	90,000	1974	73
89-304	AFC-1. Commercial fisheries development	1968	4	230,000	1972	34
	AFC-2. Anadromous salmon hatchery construction	1973	2	900,000		35
<u>NEW JERSEY</u>						
88-309	3-3-R. Disease-resistant oyster program - Delaware Bay	1967	5	150,000	1972	40
	3-114-R. A study of the basic food chain relationship in coastal salt marsh ecosystems	1969	2	21,313	1971	51
	3-120-D. Shell planting program	1970	3	300,000	1973	74
	3-137-R. Inventory of major estuarine systems	1970	4	259,000	1974	51
	3-145-D. National molluscan film	1971	1	8,000	1972	43
	3-175-R. Control of disease in oyster populations of Delaware Bay	1973	3	96,000		40
	3-191-R. Shellfish research and inventory	1973	3	54,979		77
	3-197-D. Shell planting program	1973	3	300,000		74
89-304	AFC-2. Anadromous fish inventory	1972	4	23,800		59
<u>NEW MEXICO</u>						
88-309	6-11-R. Investigations of commercial fishery potential of rough fish species	1968	4	58,000	1972	54

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Public Law	Project number and title	Date initiated	Dura- tion	Estimated total cost	Date com- pleted	Project narra- tive
		Year	Years	Dollars	Year	Page
	6-20-R. Vertical raceways and water re-use as a means of maximizing commercial trout production	1971	2	57,500	1973	31
	2-198-R. Experimental harvest of "rough" fishes from Elephant Butte Lake, New Mexico	1972	3	54,186		54
	2-210-R. Intensive vertical raceway fish production	1973	3	51,000		31
88-309	<u>NEW YORK</u>					
	3-63-R. Pond culture of oyster seed in a controlled natural environment	1967	5	214,320	1973	31
	3-95-D. Operation and maintenance of marine laboratory	1969	3	107,000	1972	48
	3-100-R. A study of burrow selection by the American lobster	1970	4	57,500	1974	73
	3-101-R. A study of bay scallop growth during fall, winter, and spring in heated salt water	1970	3	67,000	1974	31
	3-116-D. Shellfish sanitation control	1970	6	122,200		77
	3-139-D. Coordinated commercial fishery statistics program for the State of New York	1971	3	105,000	1972	80
	3-154-D. National molluscan film	1971	1	10,000	1972	43
	3-160-S. Coordination of research and development	1972	3	99,800		38
	3-161-D. Operation and maintenance of marine laboratory, Flax Pond, Old Field	1972	3	150,000		48
	3-180-D. Shellfish sanitation control utilizing a mobile laboratory	1973	3	53,700		77
	3-182-R. Primary productivity and basic food chain relationships in two Long Island bays	1973	3	82,500		53
	3-196-D. Shellfish transplants in the Marine District	1973	3	86,000		77
	3-211-R. Rehabilitation of bay scallop fishery of Long Island	1974	2	76,400		75
	2-212-R. Aspects of the American lobster in Long Island Sound	1974	3	112,700		73
89-304	AFC-8. A study of striped bass in the Marine District of New York	1972	3	120,000		68
88-309	<u>NORTH CAROLINA</u>					
	2-95-R. Scrap fish studies	1969	2	82,000	1971	69
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Public Law	Project number and title	Date initi- ated	Dura- tion	Estimated total cost	Date com- pleted	Project narra- tive
		Year	Years	Dollars	Year	Page
	2-100-R. The investigation of methods for improving and evaluating the quality of seafood products	1969	3	50,100	1972	45
	2-129-R. Studies of commercial penaeid shrimps	1970	1	14,930	1971	76
	2-139-R. Plan for fisheries resources research and development, North Carolina	1971	1	14,930	1971	49
	2-173-D(4b). Rehabilitation of oyster grounds in the Pamlico Sound area damaged or destroyed by Hurricane Ginger	1972	1	80,000	1973	78
	2-175-R. Survey of nursery areas in western Pamlico Sound	1972	2	100,000	1974	49
	2-197-R. Effects of port-harvest handling, processing, and storage on quality and properties of seafood	1972	3	50,100		45
	2-230-R. Nursery area survey of northern Pamlico Sound	1974	2	32,000		69
89-304	AFC-5. Offshore anadromous fish exploratory fishing program	1968	4	235,796	1971	41
	AFCS-8. Anadromous fish research program, northern coastal region	1971	3	460,000	1974	69
	AFCS-10. Anadromous fisheries research program - Tar River, Pamlico River, and northern Pamlico Sound	1972	2	128,600		69
	<u>NORTH DAKOTA</u>					
88-309	4-54-R. Investigations of gonadotrophins in stimulating spawning in white suckers	1969	2	3,500	1971	57
	4-55-R. A determination of nutrient exchanges and biological nutrient removal from Lake Ashtabula	1969	4	75,000	1973	53
	4-69-R. Lake Sakakawea commercial fishery investigations	1970	3	25,500	1973	55
	4-71-R. Cage culture of black bullheads	1970	2	7,000	1971	31
	1-83-R. Investigations of cage culture of rainbow trout	1972	3	9,000		31
	1-85-R. Lake Sakakawea commercial fishery investigations	1972	2	20,000		55
	<u>OHIO</u>					
88-309	4-64-D. Ohio's live bait industry - its extent, condition, and problems	1969	2	15,750	1971	41
	4-65-R. Effect of whole fish meal on reproductive performance of swine	1970	2	50,000	1971	45

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Public Law	Project number and title	Date initiated Year	Dura- tion Years	Estimated total cost Dollars	Date com- pleted Year	Project narra- tive Page
	4-68-R. Detection of <u>Myxosoma cerebralis</u> spores in holding facilities for trout	1970	3	55,000	1973	40
	3-159-R. Physiological effect of fish meal on swine reproduction	1972	3	87,000		45
88-309	<u>OKLAHOMA</u> 4-60-R. Flathead catfish movements	1969	2	34,000	1971	55
	2-140-R. Planning for the development of the commercial fishery in Oklahoma	1971	1	2,880	1971	49
	2-154-R. Oklahoma commercial fishing industry management program	1971	3	100,000		41
88-309	<u>OREGON</u> 1-58-D. Development of new human food products from shad	1970	1	12,000	1971	45
	1-59-D. Utilization of hake for human food	1970	3	50,000	1973	45
	1-60-R. Clam-oyster-abalone larval rearing	1970	3	52,000	1973	32
	1-61-R. Data analysis - Dover sole stocks	1970	1	38,500	1971	80
	1-62-R. An evaluation of methods for determining movements of shrimp	1970	1	28,500	1971	77
	1-63-R. Discoloration of fresh and frozen crab meat	1970	3	44,250	1973	45
	1-64-R. Preparation of fish protein concentrate from hake	1970	1	18,000	1971	45
	1-66-R. Crab larval rearing	1970	1	15,500	1971	32
	1-67-D. Utilization of dogfish for human food	1971	1	14,000	1972	46
	1-68-S. Coordination	1970	3	29,400	1973	38
	1-69-R. Preparation of fish protein hydrolysates	1970	3	44,000	1973	46
	1-77-D. Estuary resource surveys	1971	2	92,000	1973	52
	1-78-D. Resource survey of the continental shelf off Oregon	1971	4	366,000		60
	1-86-R. Methods of supplementing clam and abalone production	1973	3	134,128		32
	1-89-D. Utilization of seafood industry waste	1973	3	144,000		46
89-304	AFC-45. Rear and release salmonids at the Trask River rearing pond	1970	3	107,100	1973	48
	AFC-46. Effects of logging on abundance of coho salmon	1970	3	83,000	1973	53

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Public Law	Project number and title	Date initiated	Dura- tion	Estimated total cost	Date com- pleted	Project narra- tive
		Year	Years	Dollars	Year	Page
	AFC-47. Operation of the Elk River salmon hatchery	1970	3	183,000	1973	48
	AFC-48. Coordination of Public Law 89-304	1970	1	4,000	1971	39
	AFC-49. Operation of rearing ponds - North Nehalem River salmon hatchery	1970	3	76,500	1973	48
	AFC-50. Improvement of salmon and steelhead trout hatchery techniques	1970	3	828,738	1973	64
	AFC-51. Salmon and steelhead mark processing center for Pacific Coast States	1970	3	200,500	1973	80
	AFC-52. Management of the troll salmon fishery	1970	3	157,200	1973	64
	AFC-53. Shad and striped bass management study	1970	3	61,500	1973	60
	AFC-54. Salmon research on coastal streams and reservoirs	1970	3	557,000	1973	64
	AFC-55. Culture of salmon acclimated to sea water	1970	2	20,000	1972	32
	AFC-59. Expansion of Elk River hatchery	1970	1	221,344	1971	35
	AFC-62. Construct a short-term rearing pond at the Trask River salmon hatchery	1971	1	15,000	1972	35
	AFC-66. Electrical barrier - North Nehalem hatchery	1973	1	15,000	1973	36
	AFC-67. Research on anadromous fish in coastal watersheds	1973	3	730,200		64
	AFC-72. Coho salmon evaluations and coded-wire tag study	1974	3	93,000		64
	<u>PENNSYLVANIA</u>					
88-309	3-110-R. A study in the production of warmwater fish species in a vertical fish rearing facility	1970	3	79,250	1973	32
	3-112-R. Rearing trout in silos arranged in series	1970	3	111,618	1973	32
	3-147-D. National molluscan film	1971	2	10,000	1972	43
	3-167-R. A commercial fish study of the Eastern Basin of Lake Erie	1973	5	277,170		58
	3-210-R. Rearing warmwater fishes in silos	1974	2	26,300		32
89-304	AFC-4. Restoration of shad runs in the Brandywine Creek and its tributaries	1971	5	94,350		60

Public Law	Project number and title	Date initiated <u>Year</u>	Dura- tion <u>Years</u>	Estimated total cost <u>Dollars</u>	Date com- pleted <u>Year</u>	Project narra- tive <u>Page</u>
88-309	<u>PUERTO RICO</u>					
	2-41-C. Construction of fishing port facilities	1966	5	150,000	1971	33
	2-89-R. Gear research, exploratory fishing, and demonstration	1969	3	370,000	1972	41
	2-97-R. Investigations on the resource potential of the spiny lobster (<u>Panulirus argus</u> Latreille) in Puerto Rico	1969	3	63,742	1972	73
	2-98-C. Construction of commercial fisheries laboratory facilities	1969	2	199,250	1971	37
	2-104-R. Investigation of green tuna meat	1969	3	30,000	1972	46
	2-136-D. Acquisition of general use equipment for a fishery laboratory	1971	1	22,100	1972	37
	2-147-C. Commercial fisheries laboratory facilities, equipment, and incidental expenditures	1971	1	30,800	1971	37
	2-153-R. The determination of mercury in commercially important aquatic organisms	1971	1	42,000	1972	52
	2-158-C. Construction of commercial fishing facilities	1971	3	400,000		33
	2-159-R. Survey of microconstituents of canned seafood and development of protective procedures	1971	3	75,000		46
	2-163-R. The development of cultures of the channel catfish and <u>Tilapia</u> species in Puerto Rico	1971	3	122,000		32
	2-182-R. Fisheries statistical program	1967	7	635,000		80
	2-183-R. Commercial fisheries survey and development	1972	3	292,000		44
	2-184-R. Investigation on the aquaculture potential of marine organisms	1972	3	143,600	1974	32
	2-204-S. Coordination and administration	1973	3	135,000		39
88-309	<u>RHODE ISLAND</u>					
	3-113-R. The growth and movement of scup (<u>Stenotomus chrysops</u>) in Narragansett Bay	1971	2	36,500	1972	67
	3-162-R. A study of stabilization of natural scallop populations by augmentation with hatchery reared seed	1973	3	91,735		75
	3-187-R. Lobster habitat study	1973	2	22,800		73
	3-206-C. Marine research vessel acquisition	1974	1	25,000		38
	AFSC-1. Construction of fish ladders	1967	6	223,500	1973	34

Public Law	Project number and title	Date initiated <u>Year</u>	Dura- tion <u>Years</u>	Estimated total cost <u>Dollars</u>	Date com- pleted <u>Year</u>	Project narra- tive <u>Page</u>
	<u>SOUTH CAROLINA</u>					
88-309	2-105-R. Survey of oyster fishery of South Carolina	1970	2	65,000	1972	74
	2-110-R. An investigation of the off-shore demersal fish resources of South Carolina	1970	1	11,810	1971	69
	2-137-D. Development of an expanded commercial fisheries statistical program for South Carolina	1971	3	61,000	1974	81
	2-138-R. A study on the black sea bass (<u>Centropristes striatus</u>)	1971	2	16,260	1973	67
	2-179-D. Management and development of the shellfish industry in South Carolina	1972	3	122,419		74
	2-237-R. Catch and effort data for commercial fisheries	1974	1	23,744		81
89-304	AFC-4. Commercial anadromous fishery - Edisto River	1970	3	130,500	1973	69
	AFC-5. Commercial anadromous fishery, Waccamaw and Pee Dee Rivers	1973	3	150,000		70
	<u>SOUTH DAKOTA</u>					
88-309	4-18-D. Commercial fishery industry survey	1966	5	88,000	1971	81
	4-37-D. Commercial fishing gear research and development for lakes and reservoirs in South Dakota	1968	3	13,535	1971	42
	4-61-R. Paddlefish population study	1969	3	8,800	1971	56
	1-74-D. Application of sonar fish detector techniques to increase annual production	1970	3	12,160	1973	42
	1-84-D. Publication of commercial fishing information	1973	3	15,000		81
	<u>TENNESSEE</u>					
88-309	4-46-R. Freshwater mussel ecology - Kentucky Lake, Tennessee	1969	3	56,868	1972	73
	4-72-R. Investigations of parasites and diseases of cultured fishes	1970	1	9,970	1971	40
	2-142-R. Mechanisms of mercury trans-formation in bottom sediments	1971	1	20,000	1972	53
	2-144-R. Production of channel catfish in cages	1971	2	24,020	1973	33
	2-151-R. Studies of channel catfish virus disease	1971	1	6,667	1972	40
	2-176-R. Standardization of methyl mercury analysis	1972	1	24,060	1973	44

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Public Law	Project number and title	Date initiated <u>Year</u>	Dura- tion <u>Years</u>	Estimated total cost <u>Dollars</u>	Date com- pleted <u>Year</u>	Project narra- tive <u>Page</u>
	2-194-R. Parasites and diseases of cultured catfish	1972	3	32,000		40
	2-219-R. Ultrasonic fish tagging system development	1974	2	26,200		58
88-309	<u>TEXAS</u> 2-49-R. Commercial fishery landings statistical program - Study #1	1967	5	67,860	1971	81
	2-78-R. Saltwater pond research - Study #1	1968	3	211,404	1971	33
	2-109-R. Northwestern Gulf of Mexico marine fisheries investigation - Study #2	1970	3	285,772	1973	70
	2-112-R. Ecological changes associated with the industrialization of Cedar Bayou and Trinity Bay, Texas	1970	3	67,536	1972	52
	2-122-C. Jetty construction, marine fishery research station	1970	1	33,140	1971	37
	2-132-R. The population and distribution of penaeid shrimp in lower Laguna Madre	1970	2	53,647	1972	77
	2-135-D. National molluscan film	1971	1	2,000	1972	43
	2-146-D. Commercial fishery landings statistical program - Study #2	1971	3	78,740	1974	81
	2-155-R. Evaluation of effects of various coastal construction methods	1971	2	38,771	1973	52
	2-160-R. Determination of freshwater quantity standards for the Guadalupe estuary and San Antonio Bay system, Texas	1971	3	219,045		52
	2-169-R. Saltwater pond research - Study #2	1971	3	253,000		33
	2-200-R. Fishery survey of Cedar Lakes and the Brazos and San Bernard estuaries, Texas	1973	2	57,800		52
	2-202-R. Study of commercial shrimp, rock shrimp, and commercial finfish	1973	2	160,000		77
	2-218-R. Mapping of productive oyster reefs - Galveston Bay	1973	2	110,500		75
	2-220-C. Water well and sewage plant construction	1974	1	34,000		37
	2-221-R. Life history studies of flounder in Aransas Bay	1974	2	70,000		60
	2-224-R. Commercial fishery landings statistical program, Study #3	1974	3	113,300		81
	2-231-R. Survey of finfish harvest in Texas bays	1974	2	150,000		70

Public Law	Project number and title	Date initiated <u>Year</u>	Dura- tion <u>Years</u>	Estimated total cost <u>Dollars</u>	Date com- pleted <u>Year</u>	Project narra- tive <u>Page</u>
	<u>UTAH</u>					
88-309	6-10-R. Investigation of the intensity of natural selection upon different phenotypes (blood types) of rainbow trout in commercial trout rearing ponds and reservoirs	1967	3	42,000	1971	56
	6-13-R. Genetic studies of rainbow trout strains being maintained by commercial and agency hatcheries	1971	2	46,056	1973	56
	1-82-R. Commercial fisheries in a typical large shallow eutrophic Rocky Mountain lake	1972	2	40,000	1974	58
	1-87-R. Physiological-genetic studies of trout strains being maintained by commercial and agency hatcheries	1973	3	60,959		57
	<u>VERMONT</u>					
88-309	3-148-D. National molluscan film	1971	1	10,000	1972	43
	<u>VIRGIN ISLANDS</u>					
88-309	2-121-R. Research and development of deep-water commercial and sport fisheries around the Virgin Islands plateau	1970	1	28,310	1971	42
	2-161-R. Planning of Virgin Islands fisheries program	1971	1	5,600	1971	50
	2-192-R. Selective life history study of silk and blackfin snapper	1972	1	24,330	1973	67
	2-193-R. Modernization of small Virgin Islands fishing boats and equipment	1972	1	24,330		44
	<u>VIRGINIA</u>					
88-309	3-124-R. An investigation into commercial aspects of the hard clam fishery and development of commercial harvest gear for harvest of molluscs	1970	3	195,554	1973	42
	3-125-D. Virginia seafood marketing	1970	2	80,000	1972	47
	3-127-R. Testing of disease-resistant oysters	1970	1	23,750	1971	40
	3-141-D. National molluscan film	1970	2	16,000	1972	43
	3-164-D. Virginia seafood marketing	1972	2	80,000		47
	3-174-D. Fisheries statistics and library program	1972	3	31,059		81
	3-179-D. Shell planting program	1970	6	600,000		75
	3-193-R. An investigation of seed oyster resources in Virginia and the testing and modifying of gear to harvest oysters	1973	2	139,400		75
	3-208-D(4b). Shellfish emergency rehabilitation program	1974	1	505,000		78

(continued)

Public Law	Project number and title	Date initiated <u>Year</u>	Dura- tion <u>Years</u>	Estimated total cost <u>Dollars</u>	Date com- pleted <u>Year</u>	Project narra- tive <u>Page</u>
89-304	AFC-7. Biology and management of river herring and shad	1970	3	665,000		59
88-309	<u>WASHINGTON</u> 1-32-R. Hatchery coho salmon, contribution to the fishery	1966	5	92,500	1971	64
	1-42-D. Subtidal hardshell clam fisheries development	1967	4	125,405	1971	71
	1-43-R. Oyster drill (<u>Ocenebra japonica</u>) control	1967	4	55,600	1971	41
	1-50-C. Samish hatchery concrete ponds construction	1969	2	67,662	1971	
	1-52-R. Dungeness crab study	1969	2	41,000	1971	72
	1-54-R. Pink and chum salmon prediction studies	1970	2	38,000	1971	64
	1-55-R. Ocean salmon fisheries sampling	1970	1	72,123	1971	65
	1-70-R. Monitoring conditions of certain groundfish stocks, Washington trawl grounds	1970	1	137,540	1971	61
	1-71-R. Mid-water trawl fishery data analysis	1970	1	14,000	1971	81
	1-72-D. Capital Lake fall chinook rearing program	1970	1	45,200	1971	65
	1-73-D. Hatchery dry feed field tests	1970	1	45,000	1971	65
	1-75-R. Trawl fishery monitoring and data analysis studies	1971	2	273,528	1973	61
	1-76-R. Dungeness crab study	1971	2	47,000		72
	1-79-D. Subtidal clam investigations	1971	2	83,000	1974	71
	1-81-R. Puget Sound baitfish studies	1971	2	56,400	1973	60
	1-92-R. Coastal Dungeness crab study	1973	2	53,200		72
	1-93-D. Salmon spawning habitat improvement	1973	2	64,400		65
	1-94-R. Technical report on <u>Octopus dofleini</u>	1973	1	3,000	1974	44
	1-95-R. Improved methods of oyster culture and survival study	1973	2	30,000		75
	1-96-R. Skagit channel, chum evaluation study	1973	2	13,400		65
	1-97-R. Puget Sound shrimp and crab management	1973	2	35,000		77
	1-98-R. Skagit chinook race differentiation study	1973	2	47,200		65

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Public Law	Project number and title	Date initiated	Dura- tion	Estimated total cost	Date com- pleted	Project narra- tive
		Year	Years	Dollars	Year	Page
89-304	1-99-D. Salmon fishery systems analysis	1973	3	172,000		65
	1-101-R. Salmonid genetic study	1973	4	100,000		65
	AFC-37. Stream catalog - Puget Sound and Chehalis region	1969	2	52,000	1971	50
	AFC-40. Design for future program construction	1970	1	67,000	1971	50
	AFC-46. Puget Sound resident coho study	1970	4	82,240	1973	65
	AFC-49. Nemah hatchery holding and rearing pond	1970	1	41,000	1971	36
	AFC-50. Big Beef Creek chum salmon spawning success and fry quality	1970	3	355,590	1973	65
	AFC-51. Design of Humptulips salmon hatchery	1971	1	132,000	1972	50
	AFC-52. Puyallup hatchery pond and pumping plant construction	1970	1	176,636	1971	36
	AFC-53. Hood Canal pond revision	1971	1	153,000	1971	36
	AFC-54. Minter Creek adult holding and rearing pond	1971	1	90,000	1972	36
	AFC-55. Washington ocean salmon fisheries biological sampling program	1971	3	205,498		66
	AFC-56. 1971 Lake Washington sockeye tagging study	1971	1	13,524	1972	66
	AFC-57. Puget Sound fall chinook tagging study	1971	1	10,498	1972	66
	AFC-58. Hatchery dry feed field tests	1971	2	21,000	1972	66
	AFC-59. Spawning ground improvement - gravel loosening	1971	2	22,000	1973	52
	AFC-60. Coastal stream catalog assembly	1971	2	28,800	1973	50
	AFC-61. Hatchery chinook contribution to the fisheries	1971	2	244,000	1973	66
	AFC-62. Prediction studies, pink and chum salmon	1971	2	40,000		66
	AFC-63. Skagit salmon channel	1972	1	371,000	1972	36
	AFC-64. Skykomish salmon channel construction	1972	3	671,000		36
	AFC-65. Willapa hatchery auxiliary water supply	1973	1	90,000	1973	36
	AFC-66. Evaluation and coordination of mark and tag recovery study	1973	2	40,800		66
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Public Law	Project number and title	Date initiated <u>Year</u>	Dura- tion <u>Years</u>	Estimated total cost <u>Dollars</u>	Date com- pleted <u>Year</u>	Project narra- tive <u>Page</u>
	AFC-67. Assessment of production of chum salmon fry from the Big Beef Creek spawning channel	1973	3	312,510		66
	AFC-68. Public - coastal stream catalogue	1973	1	35,000		50
	AFC-69. Publish - stream catalogue, Puget Sound and Chehalis regions	1973	1	48,000		50
	AFC-70. Humptulips salmon hatchery construction	1973	4	1,250,000		37
	<u>WEST VIRGINIA</u>					
88-309	3-97-R. Mussel investigations	1969	2	61,250	1971	73
	3-128-R. Commercial fishery investigations	1970	3	20,500	1973	58
	3-173-R. Impact of commercial use of wild bait species	1972	3	57,014		54
	3-200-R. Commercial fishery investigations	1973	3	21,000		58
	<u>WISCONSIN</u>					
88-309	4-58-R. Lakes Michigan and Superior assessment studies	1969	3	75,700	1972	70
	3-133-R. Status of fish populations in Pool 7 of the Mississippi River and probable effect of gill net fishery	1970	2	12,000	1972	82
	3-166-R. Effects of commercial fishing on winter congregations of catfish	1972	1	12,000	1974	55
	3-169-R. Assessment of whitefish and related species in Lakes Michigan and Superior	1972	3	54,000		57
89-304	AFC-5. An investigation of the repro- ductive cycle of the alewife in Lake Michigan	1968	3	55,930	1971	59
	AFC-9. Mucus and osmoregulation in alewife and smelt	1970	2	35,000	1972	60
	AFC-10. Age, growth, and maturity of the smelt in Lake Michigan	1970	1	7,874	1971	67
	AFC-11. Evaluation of food-processing methods for Great Lakes anadromous fish	1971	3	74,598		66
	AFC-12. American smelt and associated species interrelationships in Lake Michigan	1972	3	61,260		67
	<u>WYOMING</u>					
88-309	1-48-R. The commercial potential of non- game fish species in impounded waters	1968	3	121,616	1971	54
	1-80-R. Feasibility of commercial exploitation of commercial fish species in impoundments	1971	3	85,742		59

PROGRAM ANALYSIS

For program analysis, projects are grouped under the type of activity undertaken rather than by State or Public Law. In doing so, the reader has all projects for a particular segment of the program, such as construction, coordination, planning, or research, in one section.

Under each type of activity included are project identification, principal investigator, current segment cost (both State and Federal) for continuing projects, total cost and year of completion for completed projects, title, and project narrative.

Requests for additional information about a project or for reprints of reports resulting from the work should be made to the appropriate NMFS Regional Office, State agency, or Cooperator. The Regional Offices, State agencies, and Cooperators, including addresses, are listed on pages 89-92, inclusive.

AQUACULTURE

Thirty-eight projects have been funded, of which 25 have been completed at a total cost (both State and Federal) of nearly \$3 million, and 13 are at various stages of completion at a total estimated cost of more than \$1.3 million. Research emphasis is on cage culture of catfish, pond culture of shellfish, rearing of trout and catfish in silos, and mass culture of abalone and shellfish.

Alabama 2-86-R	Walter M. Tatum	Completed 1973 \$92,200
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Experiments in the culture of marine species in floating baskets - The purpose of this project was to experiment with floating basket culture of marine finfish, particularly pompano in estuarine areas. Experimental procedures for raising finfish included the use of oysters and shrimp as biofactors to improve water quality and provide additional harvest.

Alabama 2-203-R	Walter M. Tatum	\$22,000
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Experiments in overwintering Florida pompano and winter culture of rainbow trout - The objectives of this study are: (1) to determine the feasibility of overwintering large numbers of pompano, and (2) to compare trout rearing in brackish and freshwater environments and to evaluate the use of trout rearing as an alternate use of pompano rearing facilities.

Arkansas 4-67-D	Richard A. Collins	Completed 1971 \$20,910
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Cage culture of fish in reservoirs - Four different designs of cages varying in depth and surface area were planted with uniformly graded fingerling catfish to determine the effect of grading on differential growth within a cage.

Arkansas 2-133-R	Richard A. Collins	Completed 1971 \$5,340
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Culturing of trout in cages - Fingerling rainbow trout were stocked in cages in a warmwater reservoir during fall, winter, and spring months to determine rate of growth and feed conversion.

Arkansas 2-148-R	Richard A. Collins	Completed 1972 \$12,820
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Efficacy of prophylactic treatments on caged catfish and investigation of cage construction materials - This project was undertaken to explore the feasibility of prophylactic treatments, including Formalin dips and others, in culture of channel catfish commercially in cages.

California 6-4-R	Shyrl Hood	Completed 1972 \$738,300
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Shellfish laboratory operations - This project provided for research on development of mass culture methods for abalone, clams, crab, oysters, and shrimp.

Mariculture research and development - This study is a continuation of research conducted under project 6-4-R for development of mass culture techniques for abalone, crab, shrimp, and other shellfish, and to develop a disease-resistant strain of Pacific oyster. The research is done at the State's Marine Culture Laboratory at Granite Canyon, Monterey County.

Florida 2-113-R

Karen Staidinger

Completed 1973
\$206,000

Development of specialized mariculture techniques on species of high potential - Methods for spawning and rearing brackish-fresh water shrimp, Florida pompano, and other finfish were investigated at Florida Department of Natural Resource's Marine Research Laboratory, St. Petersburg.

Florida 2-206-R

Charles Dugan

\$24,000

Mass culture of freshwater shrimp for commercial evaluation - The objectives are to conduct mass rearing of two species of freshwater shrimp to determine nutritional needs and relative costs. The emphasis is upon intensive culture in controlled environments.

Georgia 2-84-R

James W. Andrews

Completed 1972
\$105,000

A study of the nutritional, physiological, and economic requirements for the production of channel catfish in an intensive running water culture - This study at Skidaway Institute of Oceanography, University of Georgia, was designed to evaluate the interactions of environmental and dieting factors on growth, health, body composition, and economic aspects of channel catfish production. Environmental variables included water flow, aeration, stocking.

Georgia 2-117-R

Robert R. Stickney

Completed 1971
\$10,000

Catfish fingerling production under intensive running water conditions - The purposes of this project were to determine optional stocking density in intensive culture conditions in order to obtain optimal growth from fry to fingerling size and to update present catfish spawning methods to coincide with the needs of the intensive cultural methods.

Georgia 2-172-R

James W. Andrews

Completed 1974
\$78,750

The requirements of catfish for several nutritional and physiological variables - This was a followup of project 2-84-R and obtained additional information on catfish dietary requirements, determined the effects of certain environmental conditions on growth, and estimated the optional stocking densities for rearing fry to fingerlings in high-density culture.

Guam 4-23-D

Isaac I. Ikehara

\$36,000

The aquaculture potentials of Guam - Earthen ponds will be constructed to test the feasibility of culturing a variety of fish and shellfish species.

Hawaii H-14-D

Takuji Fujimuru

Completed 1972
\$135,375

Development of a prawn culture industry - The purpose of this project was to develop practical means for commercial culture of the giant freshwater prawn through modification of facilities and techniques used heretofore. Formulation of effective and economical prawn foods was undertaken also.

Hawaii 4-24-D

Takuji Fujimuru

\$52,000

Development of a prawn culture industry in Hawaii - This study is undertaken to reduce production cost for producing juvenile prawns in hatcheries. Reduction in production cost will be attempted by mechanizing labor-intensive jobs, developing an inexpensive feed to replace costly fresh fish flesh, reducing rearing time by manipulating temperature, and reducing mortality by filtering rearing water.

Colorado 6-11-D

Stephen A. Flickinger

Completed 1973
\$87,000

Culture of fishes with commercial importance - The objectives of this study were to explore cultural methods for the propagation of bait fish and to investigate hormonal sex control to enhance bait fish culture.

Test rearing of anadromous fish, Lemhi River drainage - The feasibility of pond rearing spring chinook salmon and summer steelhead trout to release size in the same facility utilizing controlled water temperature in 1 year was evaluated at the Hayden Creek rearing station on Lemhi River.

Illinois 4-51-R

William M. Lewis

Completed 1971
\$25,380

Considerations in the commercial production of channel catfish in cages - Channel catfish were reared in cages anchored in ponds at Southern Illinois University to determine the carrying capacity of different size ponds, optimum number of fish per cubic yard, optimum cage depth, value of mechanical aeration, and variations in fish growth.

Illinois 3-165-R

William M. Lewis

\$17,600

Stabilization of environmental conditions in fish production ponds - The objective of this study is to demonstrate that the prevention of microstratification will produce more stable conditions in warmwater fish production ponds, such as those currently used in the production of fed populations of channel catfish.

New Mexico 6-20-R

John W. Hernandez

Completed 1973
\$57,500

Vertical raceways and water re-use as a means of maximizing commercial trout production - The purpose of this project was to determine if vertical raceways, effluent purification, and re-use of effluent treated water will increase rainbow trout production in hatcheries at an acceptable cost/benefit level versus common trout pond culture.

New Mexico 2-210-R

Dick McCleskey

\$31,000

Intensive vertical raceway fish production - The objective of this study is to determine if vertical raceways, effluent purification, and re-use of effluent treated water will increase rainbow trout production in hatcheries at an acceptable cost/benefit level versus common trout pond culture.

New York 3-63-R

Arthur Brand

Completed 1973
\$214,320

Pond culture of oyster seed in a controlled natural environment - Oyster Pond, in East Hampton, Long Island, was the center of this study. Samples on a semiweekly basis were collected and analyzed to determine the biological, physical, and chemical characteristics of the pond. Data on intensity of spawning, setting, and survival were also obtained from spat set on hard bottom areas and rafts.

New York 3-101-R

Robert C. Batson

Completed 1974
\$67,000

A study of bay scallop growth during fall, winter, and spring in heated salt water - The objective was to determine the usefulness of heated discharge water from power stations and desalination plants in promoting bay scallop growth.

North Dakota 4-71-R

James Reilly

Completed 1971
\$7,000

Cage culture of black bullhead - This project was undertaken at the State-owned Spiritwood Lake fish hatchery to determine the growth rate of black bullhead produced on a commercial diet and the feasibility of the commercial production of the species by cage culture.

North Dakota 1-83-R

James Reilly

\$5,000

Investigation of cage culture of rainbow trout - This study will determine the growth rate of rainbow trout reared in cages in Hooker Lake during a 180-day rearing period. After cage rearing, the fish will be subjected to flesh analysis, tagged, and released in the lake. Recaptures will be examined for changes in flesh and growth rate determined.

Oregon 1-60-R	Wallace F. Hublou	Completed 1973 \$52,000
<u>Clam-oyster-abalone larval rearing</u> - The purpose was to develop techniques for mass culturing clams, oysters, and abalone to assess the feasibility of artificial propagation as a supplement to natural production.		
Oregon 1-66-R	C. Dale Snow	Completed 1971 \$15,500
<u>Crab larval rearing</u> - Dungeness crab larvae were challenged to different current velocities and light intensity to gain information for development of techniques for sampling larvae at sea.		
Oregon 1-86-R	C. Dale Snow	\$35,780
<u>Methods of supplementing clam and abalone production</u> - This study will expand the previous project (1-60-R) to improve on existing and/or develop new techniques for spawning, rearing, and planting Manila littleneck clams and to determine suitable habitat for planting. Work on abalone will be similar to that for clams.		
Oregon AFC-55	William J. McNeil	Completed 1972 \$20,000
<u>Culture of salmon acclimated to sea water</u> - The project was research on new techniques for the artificial culture of salmon at Oregon State University's Netarts Bay Laboratory. It included pilot production of juvenile salmon for direct release into marine waters, testing of prototype hatchery system for producing salmon acclimated to sea water, hybridization of salmon to obtain fish which adjust readily to sea water as fry, and other related studies.		
Pennsylvania 3-110-R	Arthur Bradford	Completed 1973 \$79,250
<u>A study of the production of warmwater fish species in a vertical fish rearing facility</u> - Purpose of this study was to investigate the feasibility of rearing warmwater fish in a vertical rearing unit (silo) with special emphasis on channel catfish.		
Pennsylvania 3-112-R	Shyrl Hood	Completed 1973 \$111,618
<u>Rearing trout in silos arranged in series</u> - The purpose of this study was to design a series of silos which will have suitable conditions for increasing the production of trout per unit of flow.		
Pennsylvania 3-210-R	Charles Emery	\$12,620
<u>Rearing warmwater fishes in silos</u> - The objective of this study is to determine if silos are adaptable as culture units for baitfish and warmwater gamefish. Species of particular interest are fathead minnows and walleye.		
Puerto Rico 2-163-R	Francisco A. Pagan	\$38,300
<u>The development of culture of the channel catfish and Tilapia species in Puerto Rico</u> - This project is an attempt to develop cultures of channel catfish and <u>Tilapia</u> species for introduction to the Island of an additional source of protein and an income for potential aquafarmers. Potential production in ponds, raceways, and cages at different water levels and flow will be evaluated.		
Puerto Rico 2-184-R	Kenneth W. Walters	Completed 1974 \$143,600
<u>Investigation on the aquaculture potential of marine organisms</u> - Suitability of selected marine fish and invertebrates for aquaculture was investigated. Also, techniques for commercial rearing were studied.		

Production of channel catfish in cages - Cages were stocked with various numbers of 5-inch channel catfish fingerlings with daily feedings of some lots of complete floating feed, and others were fed with trout pellets for varying number of days to determine optimum production conditions. The effects of repeated noises and other disturbances on growth rate of the caged fish were observed also.

Texas 2-78-R

Larry Elam

Completed 1971

\$183,820

Saltwater pond research - This project used 21 ponds constructed at the saltwater pond experimental station near Palacios under project 2-14-C to develop and expand mariculture practice and procedures. A variety of fish and shellfish were reared under various artificial ecological conditions. Chemical and physical factors were measured to determine the effects on growth and survival of the different species.

Texas 2-169-R

Larry Elam

\$83,404

Saltwater pond research - Study #2 - Shrimp, oyster, redfish, black drum, and spotted trout will be reared in an artificial environment to improve on techniques for pond conditioning, disease control, and growth and feedings.

CONSTRUCTION

Forty-five construction projects have been initiated, of which 32 have been completed at a total cost of more than \$9 million, and 13 are continuing at various stages of completion at an estimated total cost of more than \$3.5 million. Emphasis has been on construction of salmon hatcheries, fish screens, and research laboratories and vessels.

FISH CULTURE FACILITIES

California 6-12-C

C.S. Kabel

Completed 1971

\$32,000

Shellfish laboratory - water supply construction and electrical power installation - Provided for construction of sea water supply and drain system and electrical service unit for the State-owned shellfish laboratory on Granite Creek, Monterey County.

FISH LANDING FACILITIES

Puerto Rico 2-41-C

Rolf Juhl

Completed 1971

\$250,000

Construction of fishing port facilities - This project provided for construction of essential fishing port facilities at Barrero at Rincon, Puerto Nuevo at Vega Baja, Cerro Gordo at Vega Alta, Culebra Island, Punta Santiago at Humacao, and Hucres at Naguabo to facilitate and stimulate the fishing activity.

Puerto Rico 2-158-C

Angel Negron Dóvila

\$109,596

Construction of commercial fishing facilities - This is a continuation of project 2-41-C and provides for construction of additional landing, handling, and storing facilities at fishing ports in the Islands to upgrade present conditions and to promote an increase in fisheries production and utilization.

FISH SCREENS AND STREAM IMPROVEMENT FACILITIES

California AFC-9

John Radovich

Completed 1971

\$225,000

Banta-Carbona fish screen construction - A fish screen was constructed at Banta-Carbona Irrigation Diversion to prevent losses of downstream migrant chinook salmon to the diversion from San Joaquin River. The construction site is near Diablo, San Joaquin County.

California AFSC-10

James F. Keating

Completed 1972

\$2,540,000

Glenn-Colusa fish screen construction - Provided for construction of a fish screen to prevent loss of downstream migrant salmonids in the irrigation diversion of the Glenn-Colusa Irrigation District from the Sacramento River near Hamilton City, Glenn County.

California AFC-11

C.S. Kabel

Completed 1971
\$90,000

El Solyo fish screen construction - Provided for construction of a fish screen to prevent loss of downstream migrant salmonids in the irrigation diversion in the El Solyo Irrigation District from the San Joaquin River near Vernalis, Stanislaus County.

Delaware AFSC-3

Charles A. Lesser

Completed 1972
\$120,000

Shad passageway construction on the Brandywine River - Fish passage facilities were constructed on 11 low-head dams on Brandywine Creek, tributary to Delaware River. Passage facilities at all obstructions will make available about 35 miles of spawning and nursery areas to anadromous fish, principally American shad.

Delaware-Pennsylvania AFSC-4

Robert A. Beck

\$7,500

Restoration of shad runs in the Brandywine Creek and its tributaries - Results of a recently completed project indicated that the Brandywine Creek above impoundments was suitable for hatching shad eggs and that adult shad moved upstream through passage facilities provided at the first two obstructions. This project will continue construction of passage devices at upstream obstructions. Concurrent with the construction, spawning success of passed fish will be evaluated. Additionally, fertilized shad eggs will be collected from other runs and planted in the stream.

Maine AFC-6,15

Lewis N. Flagg

Completed 1974
\$180,000

Fishway construction and stream improvement - The purpose of this project was to increase production and landings of commercial anadromous species in Maine through a fishway construction and stream improvement program.

Massachusetts AFC-1

Clinton Watson

Completed 1971
\$218,272

Anadromous fish investigations - Fish passage needs for upstream movement of river herrings and American shad have been surveyed on coastal streams. Construction of passage facilities is underway on streams in Bristol and Barnstable Counties.

Massachusetts AFCS-9

Joseph DiCarlo

Completed 1974
\$257,000

Anadromous fisheries development - This project provided for plans, designs, modifications, and construction of fish passage facilities in coastal streams in an effort to restore and establish new runs of anadromous fish.

Massachusetts AFCS-14

Joseph DiCarlo

\$17,500

Anadromous fisheries management - This project provides for plans, designs, modifications and construction of fish passage facilities in coastal streams to restore and establish new runs of anadromous fish and to provide the liaison between the State and local communities in all matters pertaining to anadromous fisheries management and development.

New Hampshire AFC-1

Allen I. Lewis

Completed 1972
\$280,000

Commercial fisheries development - To construct fish passage facilities at the first dam upstream from tidewater on the Exeter River, Rockingham County, for the upstream passage of alewife and American shad.

Rhode Island AFSC-1

John M. Cronan

Completed 1973
\$223,500

Construction of fish ladders - The objective was to construct fish ladders and/or removal of obstructions to provide upstream passage of alewife, American shad, and sea-run trout in Hunt River, Kent County, Annaquatucket River, Washington County, and Saugatucket River, Washington County.

HATCHERIES AND HATCHERY FACILITIES

Alabama AFCS-5	Wayne E. Swingle	Completed 1973 \$253,200
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Construction of an anadromous fish hatchery and rearing facility - This project was undertaken to acquire property and construction facilities for spawning, hatching, holding, and rearing striped bass and other anadromous fish.

Alabama AFC-8	Engineering Section	\$3,000
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Installation of heating/cooling system in hatchery building - To install heating and cooling systems in striped bass hatchery which was completed under the program in 1973.

California AFSC-1	Alex Calhoun	Completed 1972 \$2,684,250
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Mad River hatchery construction - A salmon and steelhead trout hatchery with water reconditioning system was constructed on the Mad River near Arcata, Humboldt County. When fully operative the hatchery will have potential annual production of 1 million yearling coho salmon and 5 million yearling chinook salmon.

California AFC-3	C.S. Kabel	Completed 1971 \$40,000
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Mad River hatchery fish ladder (formerly Casper Creek egg-taking station) - Fish passage facility was constructed to provide entry of adult chinook and coho salmon and steelhead trout into egg-taking station of Mad River hatchery. (See California FASC-1)

Idaho 1-51-C	James F. Keating	Completed 1971 \$30,200
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Construction of facilities at Hayden Creek Ponds - Provided for construction of feed and equipment storage sheds at Hayden Creek rearing ponds constructed in 1969 under project 1-9-C.

Massachusetts AFC-13	Calton H. Bridges	\$100,000
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Hatchery modification for hatching and rearing Atlantic salmon - State-owned trout hatcheries located at Palmer, Hampden County, and at Sunderland, Franklin County, are modified to produce Atlantic salmon smolts for stocking into the Connecticut River directly as smolts and by "imprint" or "stock-out ponds." The potential production by the new facilities is up to 200,000 smolt.

New Hampshire AFC-2	State Engineers	\$900,000
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Anadromous salmon hatchery construction - Provides for design and construction of a salmon hatchery on the Souhegan River, Hillsboro County, for the production of Atlantic and coho salmon. The station will be capable of producing about 500,000 salmon smolts annually.

Oregon AFC-59	Edward K. Neubauer	Completed 1971 \$221,344
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Expansion of Elk River hatchery - Provided for construction of an additional 10 rearing ponds and supporting facilities for production of fall chinook, coho, or steelhead trout. The additional ponds increased the rearing capacity of the hatchery from 1 million to 1,700,000 fish.

Oregon AFC-62	Ernest R. Jeffries	Completed 1972 \$15,000
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Construct a short-term rearing pond at the Trask River salmon hatchery - Provided for construction of a rearing pond for initial rearing of about 1.5 million juvenile coho salmon to a size of about 500 fish per pound.

Electrical barrier - North Nehalem hatchery - The purpose of this project was to construct an electrical barrier across the North Nehalem River adjacent to the State-owned North Nehalem salmon hatchery. The barrier is used to divert upstream migrant salmon into holding pens for examination and counting.

Washington 1-50-C

Marshall Thayer

Completed 1971
\$67,662

Samish hatchery concrete pond construction - Provided for construction of four additional concrete ponds which added about 24,000 pounds of juvenile salmon annually to the production of the State-owned Samish hatchery near Burlington.

Washington AFC-36

Russell K. Jones

Completed 1971
\$69,000

Skykomish hatchery concrete pond construction - This project provided for construction of a series of ponds at the Skykomish hatchery, Skykomish County. The additional ponds increased annual hatchery production by 24,000 pounds.

Washington AFC-49

Russell Webb

Completed 1971
\$41,000

Nemah hatchery holding and rearing pond - Provided for enlargement and modernization of an existing dirt pond to a 1/3-acre asphalt-lined combination salmon adult holding, spawning, and juvenile rearing pond to increase station output.

Washington AFC-52

Russell Webb

Completed 1971
\$179,636

Puyallup hatchery pond and pumping plant construction - To increase rearing capacity of the State-owned Puyallup salmon hatchery, four new concrete ponds, two new $\frac{1}{4}$ -acre asphalt-lined ponds, and a combination fishway and pumping station were built at this station which is located near Orting, Pierce County.

Washington AFC-53

Russell Webb

Completed 1971
\$153,000

Hood Canal pond revision - Existing releasing area was rebuilt into an adult holding pond to permit species segregation and to provide a pond for off-season juvenile salmon rearing which increased this State-owned hatchery at Hoodsport (Mason County) output 15,000 pounds of chinook salmon annually.

Washington AFC-54

Russell Webb

Completed 1972
\$90,000

Minter Creek adult holding and rearing pond - Provided for construction of a 50- by 180-foot asphalt-lined adult salmon holding facility which also will be used seasonally for juvenile rearing to increase the Minter Creek salmon hatchery (Pierce County) by an estimated 20,000 pounds of chinook salmon annually.

Washington AFC-63

State Engineers

\$371,000

Skagit salmon channel construction - Provides for facilities to increase production of pink, chum, chinook, and coho salmon at the Skagit Hatchery near the confluence of Clark and Jordan Creeks with the Cascade River, Skagit County.

Washington AFC-64

State Engineers

\$82,000

Skykomish salmon channel construction - Provides for facilities and water to increase the production of pink, chum, chinook, and coho salmon at the Skykomish Hatchery near Startup Skykomish County.

Washington AFC-65

R.K. Jones

\$90,000

Willapa hatchery auxiliary water supply - Installed a new pumping station at the State-owned Willapa hatchery near Raymond, Washington, to increase station water flow by an immediate 8 c.f.s., and an eventually increase of 24 c.f.s. The 8 c.f.s. increase in flow will increase station output by 52,000 pounds of coho and chinook salmon, which will have total annual benefit of \$365,000 to the fishery.

Humtulpis salmon hatchery construction - Provides construction of a salmon hatchery on the Humtulpis River near its confluence with outer Grays Harbor, Grays Harbor County. The station will add approximately 100,000 pounds of coho and chinook seaward migrants to the hatchery system output. It is calculated that the returning adults will yield 5,190 salmon to the sport fishery and 59,890 fish to the commercial fishery.

LABORATORY

Maine AFCS-9	Richard P. Choate	Completed 1972 \$200,000
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Phase II - marine research laboratory construction - The objective of this project was to construct the second phase of new marine research laboratory.

Massachusetts 3-74-C	A. Russell Ceurvels	Completed 1972 \$400,000
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Marine research laboratory construction - This project provided for construction of a marine research laboratory and installation of needed equipment at Cat Cove, Salem. The single-story structure will be about 60 feet by 90 feet and will provide research space for shellfish larviculture.

Puerto Rico 2-98-C	Rolf Juhl	Completed 1971 \$199,250
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Construction of commercial fisheries laboratory facilities - Provided for construction of commercial fisheries laboratory building foundation and a roadway linking the laboratory with the main highway on Guanajibo Point south of Mayaguez. The laboratory was partly constructed under project number 2-40-C.

Puerto Rico 2-136-D	Rolf Juhl	Completed 1972 \$22,100
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Acquisition of general use equipment for a fishery laboratory - Equipment, including water supply and pumping facilities and furniture, was purchased for new commercial fisheries research laboratory which was constructed under the program. The laboratory is located at Punta Guanajibo, Cabo Rojo.

Puerto Rico 2-147-C	Rolf Juhl	Completed 1971 \$29,270
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Commercial fisheries laboratory facilities, equipment, and incidental expenditures - This project provided for construction of a fence and purchase of accessway facilities and equipment at the research laboratory constructed under P.L. 88-309 at Punta Guanajibo, Cabo Rojo.

Texas 2-122-C	Terrance R. Leary	Completed 1971 \$33,140
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Jetty construction, marine fishery research station - Provided for construction of permanent jetties to afford protection to channels providing water and access to the Coastal Fisheries Experiment Station constructed under project 2-77-C near Palacios.

Texas 2-220-C	Clayton T. Garrison	\$34,000
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Water well and sewage treatment plant construction - This project will provide a dependable supply of good quality fresh water for use in research ponds at the Marine Fisheries Research Station and to provide for adequate treatment of domestic wastes.

RESEARCH VESSELS

American Samoa H-16-C	Stanley N. Swerdloff	Completed 1971 \$85,000
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Acquisition of multi-purpose research vessel - Provided for acquisition of a 50-foot vessel for research projects including pelagic and bottom fish surveys, exploratory fishing, and gear appraisal.

American Samoa H-17-D

Stanley N. Swerdloff

Completed 1972
\$10,000

Acquisition of a prototype demonstration fishing vessel for American Samoa - A small fishing vessel to be used to demonstrate fisheries methods, potential, and benefits to trainees was acquired.

New Hampshire 3-122-D

Richard G. Seamans, Jr.

Completed 1971
\$20,000

Acquisition of marine workboat - Provided for acquisition of a boat of a type and size to allow for the safe and efficient conduct of marine research and development projects in coastal waters.

Rhode Island 3-206-C

Richard Sisson

\$25,000

Marine research vessel acquisition - Provides for the construction of a 45-foot dredge boat to conduct marine research and development projects in coastal waters.

COORDINATION

Twelve coordination projects have been funded in 9 States and Puerto Rico for administration, including planning, coordinating, and supervisory project work, of Public Law (P.L.) 88-309 and P.L. 89-304. Of the projects funded, 4 have been completed at a total cost (both State and Federal) of \$187,734 and 8 are continuing at various degrees of completion at a total estimated cost of more than \$2 million.

Alaska 5-33-S

Gary Finger

\$44,000

Coordination and planning - Provides for administration of P.L. 88-309 projects.

Alaska AFC-36

Gary Finger

Completed 1973
\$279,600

Coordination - Provides for administration of P.L. 89-304 projects.

California 6-16-S

Stanley Kabel

\$36,700

Coordination - Provides for administration of P.L. 88-309 projects.

Georgia 2-205-S

W.W. Anderson

\$11,000

Coordination - Provided for administration of P.L. 88-309 projects.

Louisiana 2-212-S

William S. Perret

\$29,000

Coordination - Provides for administration of P.L. 88-309 projects.

Maine 3-183-S

Richard P. Choate

\$48,066

Coordination - Provides for administration of P.L. 88-309 projects.

Maryland AFC-6

George J. Murphy

Completed 1971
\$13,000

Coordination - Provided for administration of P.L. 89-304 projects.

Massachusetts 3-192-S

William A. Fitzpatrick

\$52,450

Coordination - Provides for administration of P.L. 88-309 projects.

New York 3-160-S

Pieter Van Volkenburgh

\$32,100

Coordination of research and development - Provides for administration of P.L. 88-309 projects.

Oregon 1-68-S

Robert E. Loeffel

Completed 1973
\$29,400

Coordination - Provided for administration of P.L. 88-309 projects.

Coordination of Public Law 89-304 - Provided for administration of P.L. 89-304 projects.

Puerto Rico 2-204-S

Jose A. Suarez-Caarbo

\$45,000

Coordination and administration - Provides for administration of P.L. 88-309 projects.

DISEASE AND PARASITE CONTROL

Sixteen projects for study of diseases and parasites in finfish and shellfish, with emphasis on development of disease-resistant oyster and control of parasites and diseases in Great Lakes fish, have been initiated. Of these projects initiated, 11 have been completed at a total cost of \$851,322, and 5 at an estimated total cost of \$610,578 are at various stages of completion.

Maryland 3-75-R

Fred Sieling, Jr.

Completed 1971

\$97,500

Development of disease-resistant oysters (C. virginica) under field conditions in lower Chesapeake Bay - The level of MSX incidence in oysters on natural bars in the Manokin River was studied. Spat from disease-resistant brood stocks were used to repopulate areas where heavy mortalities occur.

Maryland 3-131-R

Fred Sieling, Jr.

Completed 1973

\$111,906

Molluscan mortality studies - Determined prevalence and infection intensities of parasites and diseases affecting the oyster resources and other molluscan species in Chesapeake Bay and tributaries.

Maryland 3-188-R

Sara V. Otto

\$28,408

Marine animal disease investigations - This study is designed to isolate and screen infectious and non-infectious disease entities believed to be responsible for mass mortalities of finfish and oysters in Chesapeake Bay.

Michigan AFC-9

L.N. Allison

Completed 1973

\$71,368

Parasites and diseases of anadromous and commercial fish - This project was undertaken at the State's Fish Pathology Laboratory at Grayling to develop and evaluate diagnostic and clinical techniques to be applied by fish managers with emphasis on hatchery problems.

Mississippi 2-85-R

David Cook

Completed 1972

\$114,845

A study of the parasites and diseases of fish, mollusks, and crustacea utilized in mariculture - This study was made by the Gulf Coast Research Laboratory to identify the parasites and diseases of marine species that are of potential value in mariculture, to determine the conditions under which these parasites and diseases exist, and to seek effective methods of control of the parasites and diseases of marine species under conditions of mariculture.

Mississippi 2-174-R

Robin M. Overstreet

\$38,300

Parasites, diseases, and control of diseases of commercially important finfish and shellfish - This study is conducted from the Gulf Coast Research Laboratory to assess the parasites and diseases from selected hosts, such as Florida pompano, Atlantic croaker, striped mullet, blue crab, and shrimp that could affect the corresponding commercial fishery. Methods to control some of the diseases present in rearing facilities will be investigated.

Missouri 4-66-R

Robert C. Summerfelt

Completed 1971

\$4,313

Transmission of an ovary parasite of the golden shiner - This work was carried out at the Ozark Fisheries, Stoutland, to make the following determinations concerning the transmission of protozoan in golden shiner: if transmission per se is feasible, if transmission results from spore attachment to the egg membrane, and if hereditary (intraovum) transmission is possible.

Equipping fish disease laboratory - Equipment was provided for a fish disease diagnostic laboratory so that it will be possible to control or eradicate such problems in State and commercial hatcheries.

New Jersey 3-3-R

Harold Haskin

Completed 1971
\$150,000

Disease-resistant oyster program - Delaware Bay - This project was a continuing study to provide basic knowledge for consistent production of a disease-resistant stock of oyster seed and to increase the yield of marketable oysters from such seed through control of various causes of mortality. These objectives were approached by experimental testing of disease resistance in the field, experimental approach to control predators, use of lower Delaware Bay spat as seed oysters, and artificial rearing of disease-resistant strains of oysters at the Cape Shore Laboratory.

New Jersey 3-175-R

Harold Haskin

\$32,000

Control of disease in oyster populations of Delaware Bay - The objectives of this project are to maintain surveillance of MSX prevalence and intensity in oyster-producing areas of Delaware Bay and to maintain laboratory-reared stocks of oysters with potential for developing disease resistance.

Ohio 4-68-R

Wilbur M. Tidd

\$20,000

Detection of Myxosoma cerebralis spores in trout holding facilities - The purpose of this study is to develop an accurate method for detecting spores of Myxosoma cerebralis in holding facilities of rainbow trout and to determine concentrations necessary to transmit the disease. Effects of water temperature and water chemistry on spore development will be investigated also.

Tennessee 4-72-R

W.A. Rogers

Completed 1971
\$9,970

Investigations of parasites and diseases of cultured fish - This project provided for laboratory experiments under different water qualities such as hardness, temperature, pH, and turbidity, to test the efficacy of various chemicals that are effective pathogen controls. The work was done at Auburn University, Auburn, Alabama.

Tennessee 2-151-R

W.A. Rogers

Completed 1972
\$6,667

Studies on channel catfish virus disease - The purpose of this study was to determine if channel catfish brood stock are carriers of viable virus and, if so, whether or not the virus is shed in excretory products or passes to the offspring via sex products.

Tennessee 2-194-R

W.A. Rogers

\$10,667

Parasites and diseases of cultured catfish - The objective of this study is to provide diagnostic service to commercial catfish producers by identification of disease-producing organisms. Laboratory research will be done on the organisms to determine pathogenic qualities and to test efficacy of various chemicals.

Virginia 3-127-R

Jay A. Andrews

Completed 1971
\$23,750

Testing of disease-resistant oysters - Selecting and testing of resistant stocks by mass selection and progeny-testing techniques were investigated. Monitoring of seed areas for level of resistance to MSX and exploring the manipulation of seed and brood stocks to avoid losses of MSX and other mortality agents were investigated also.

Oyster drill (Ocinebra japonica) control - The behavior patterns of Japanese oyster drills and egg cases, and control measures were the main purpose of this study at the Point Whitney Shellfish Laboratory, Brinnon. Investigations in the laboratory and in the field indicate that the male drills are attracted to a water-borne substance released by the female. Further work defined this substance. The testing of chemicals to control the drill is continuing.

ECONOMICS

One project with emphasis on economic aspects of the baitfish industry has been completed.

Ohio 4-64-D

John M. Pierce

Completed 1971
\$15,750

Ohio's live bait industry: its extent, condition, and problems - Under this project an evaluation was made of the economic importance of the live bait industry to Ohio's economy. Also, problems of the industry were investigated to assist in the development and growth of the industry.

EXPLORATORY FISHING AND GEAR DEVELOPMENT

Ten projects have been funded to evaluate currently used fishing gears, develop new gears, and locate new fishery resources. Of the projects funded, 8 have been completed at a total cost of more than \$1.1 million, and 2 are continuing at an estimated total cost of about \$100,000.

American Samoa H-15-D

James R. Holloway, Sr.

Completed 1972
\$242,250

Development of a pole and line skipjack tuna fishery in American Samoa - Objectives of this project were to determine the distribution and abundance of bait fish in Samoa waters.

Kentucky 2-227-R

Morgan E. Sisk

\$12,000

Commercial fishing gear evaluation - The objective of this study is to determine the comparative catchability of two types of slat traps with the standard commercial hoop net. The work will be carried out in Kentucky portion of Kentucky Lake.

New Hampshire 3-105-R

William C. Ayer

Completed 1971
\$40,650

A comparative study of conventional and experimental inshore lobster gear - The main objective of this project was to analyze the efficiency and economy of commercial experimental and conventional inshore lobster gear in order to determine the best type of gear for harvesting the resources.

North Carolina AFC-5

Frank Holland

Completed 1971
\$235,796

Offshore anadromous fish exploratory fishing program - Exploratory fishing was conducted along the Outer Banks to determine the distribution and relative abundance of American shad, striped bass, and other anadromous fish.

Oklahoma 2-154-R

Bob Grinstead

\$42,400

Oklahoma commercial fishing industry management program - This project is undertaken to obtain information on commercial fish, mussel, bait fish, and fish farming throughout the State with emphasis on the Keystone and Texoma Reservoirs, to more effectively manage and regulate these resources.

Puerto Rico 2-89-R

Rolf Juhl

Completed 1972
\$370,000

Gear research, exploratory fishing and demonstrations - Improved boats, equipment, and gear were introduced to upgrade the Puerto Rico fisheries. Also, new fishing areas were located and improved fishing techniques and equipment were demonstrated.

South Dakota 4-37-D

Donald Warnick

Completed 1971
\$13,535

Commercial fishing gear research and development for lakes and reservoirs in South Dakota - The catch data from floating trap nets constructed in 1968 were compared with catches from gill nets and frame nets normally used by commercial fishermen. These data were evaluated to determine the most efficient methods of harvesting buffalofish, carp, and sucker.

South Dakota 1-74-D

Charles Backlund

Completed 1973
\$14,160

Application of sonar fish detector techniques to increase annual production - The purpose of this study was to familiarize commercial fish contractors with recently developed under-ice fish detection techniques in an effort to increase their harvest.

Virgin Islands 2-121-R

Arthur E. Dammann

Completed 1971
\$28,310

Research and development of deep-water commercial and sport fisheries around the Virgin Islands plateau - Exploitable resources of bottom fishes around the 100-fathom curve were defined through exploratory fishing with reels, bottom lines, and traps. Also, commercial and sport fishermen were assisted in location of these resources and informed about methods of harvesting the fish.

Virginia 3-124-R

Dexter S. Haven

Completed 1973
\$195,554

An investigation into commercial aspect of the hard clam fishery and development of commercial gear for harvest of molluscs - This project was undertaken to develop a medium-size tow hydraulic dredge to harvest clams.

EXTENSION SERVICE

Twenty-one projects have been funded to assist the commercial fishing industry to reduce operation costs and increase efficiency in producing, harvesting, processing, storing, and transporting of fish and fish products. Of the projects funded, 12 have been completed at a total cost (both State and Federal) of about \$1 million and 9 are continuing at various stages of completion at a total estimated cost of \$847,390.

Alabama 2-141-R

Wayne E. Swingle

Completed 1974
\$34,000

Publication and reproduction of research reports - Provided for publication of findings from Federal aid and other research projects, purchase of reprints, and distribution of these publications and reprints.

Alabama 2-216-R

Edwin B. May

\$20,000

Preparing data on oyster fishery, dredging and geology for publication - Available oyster fishery management data and historical information will be compiled and presented in perspective to known problems of salinity variations, river discharge, siltation, oxygen levels, and others.

Alabama 2-229-R

Wayne E. Swingle

\$10,000

Distribution, publication, and reproduction of research reports - The objective of this project will be to publish technical information and distribute to approximately 800 institutions, libraries, laboratories, State and Federal agencies and technical personnel.

Delaware 3-216-D

Charles A. Lesser

\$20,000

Technical assistance to commercial fisheries - Purpose of this project is to provide technical assistance to commercial fishermen, seafood industries, and governmental authorities regarding the management, enforcement, and dissemination of data pertaining to commercial fisheries.

Florida 2-126-D	Charles B. Davies	Completed 1971 \$34,870
<u>Fisheries technical assistance</u> - This project was undertaken to train seafood quality control personnel in sanitation and quality retention and to provide advisory assistance to industry.		
Florida 2-152-D	Frances Felsburg	Completed 1972 \$147,577
<u>Fisheries extension service</u> - Efforts were made to restore consumer confidence in fisheries products through accepted extension service and demonstration techniques.		
Florida 2-177-D	C.B. Davies	Completed 1974 \$4,000
<u>National molluscan film</u> - Purpose of this project was to purchase 10 copies of the national molluscan film developed by a multi-State cooperative effort under P.L. 88-309.		
Guam H-12-D	Isaac I Ikehara	Completed 1972 \$120,000
<u>Development of Guam's commercial fisheries potentials</u> - The purpose of this study was to develop methods to increase commercial fish catch efficiency by training fishermen in the use of more efficient techniques and to locate species of fish of commercial importance.		
Maine 3-13-D	Paul M.W. Venno	Completed 1973 \$176,000
<u>Maine marine fisheries extension service</u> - This project was undertaken to disseminate information about the various commercial fisheries to the fishing industry along the coast of Maine and to potential members of the industry.		
Maine 3-177-D	Afton H. Farrin, Jr.	\$31,000
<u>Marine resources extension services</u> - The objective of this project is to revitalize the fishing industry of Maine by (1) increasing the use of applied research, (2) developing underutilized fish resources, (3) disseminating research information to the fishing industry, and (4) promoting improved facilities for use by the fishing industry.		
Maryland 3-126-D	William Sieling	Completed 1973 \$81,000
<u>Seafood extension service</u> - Results of scientific investigations, technological developments, and marketing opportunities were disseminated to persons who harvest and process fishery resources.		
Maryland 3-190-D	F. William Sieling III	\$42,496
<u>Fisheries extension service</u> - The objectives are to disseminate information on scientific investigations, technology developments, and seafood marketing opportunities to fish harvesters and processors and to legislative officials of the State.		
Florida 2-177-D	C.B. Davies	
Maryland 3-144-D	George Murphy	
New Hampshire 3-146-D	Bernard Corson	
New Jersey 3-145-D	Russ Cookingham	
New York 3-154-D	Samuel L. Finkelstein	
Pennsylvania 3-147-D	Howard L. Miller	
Texas 2-135-D	William B. Schwartz	
Vermont 3-148-D	Edward F. Kehoe	Completed 1972
Virginia 3-141-D	Milton T. Hickman	\$72,000
<u>National molluscan film</u> - This project was a multi-State cooperative effort for development of the shellfish industry through the purchase and distribution of a national molluscan film.		

Shellfish technical assistance - Technical assistance and advice were provided to town and regional shellfish management programs. Management practices such as raft culture of oysters, collection and redistribution of spat, reseeding operations, predator control, and other activities designed to increase harvests were encouraged.

Massachusetts 3-109-D

Charles E. Martin

Completed 1974
\$200,000

Massachusetts commercial fisheries extension service - Objectives of this project were to establish and conduct a commercial fisheries extension service providing on-site technical advisory services, dissemination of information, and an avenue of communication between the fishing industry and research groups, designed to improve the economic posture of the Commonwealth's fishing community.

Massachusetts 3-178-D

John M. Hickey

\$14,000

Shellfish technical assistance - The objective of this work is to provide technical assistance to the shellfish fishing industry in modern ways of culturing and harvesting important shellfish along the Massachusetts coast.

Massachusetts 3-207-D

Phil Coats

\$50,000

Massachusetts commercial fisheries extension service - The primary objective of this study will be to provide all segments of the Massachusetts (and New England) fishing industry with information and technical assistance.

New York 3-213-D

Pieter Van Volkenburgh

\$5,000

National shellfish consumer education film - This project will enter into an agreement or subcontract with the Shellfish Institute of North America to purchase 25 copies of a national shellfish consumer education film.

Puerto Rico 2-183-R

Jon S. Cole

\$100,000

Commercial fishing survey and development - This project is undertaken to upgrade the commercial fishing industry through the expansion of fishing areas and introduction of improved fishing vessels, equipment, and fishing methods.

Tennessee 2-176-R

Peter Krenkel

Completed 1973
\$24,000

Standardization of methyl mercury analysis - This study was undertaken to obtain or produce a procedure for analysis of methyl mercury and derivatives so a reasonably well trained technician can make an analysis on both fish tissue and sediments.

Virgin Islands 2-193-R

Joseph R. Sylvester

\$24,330

Modernization of small Virgin Island fishing boats and equipment - The purpose of this project is to demonstrate and apply modern fishing gear to fishermen to improve and update local fisheries. In addition, the small demonstration boats will be equipped with necessary gear.

Washington 1-94-R

R.W. Westley

Completed 1974
\$3,000

Technical report on Octopus dofleini - Various papers in Japanese concerned with Octopus dofleini were translated, and about 100 copies of the translated version were published.

FISHERY PRODUCTS TECHNOLOGY

Fifteen projects have been funded in 4 States and Puerto Rico to obtain information that would assist the fishing industry in harvesting, handling, and processing raw fish harvested. Of the projects funded, 11 have been completed at a total cost of \$528,747 and 4 are continuing at various stages of completion at an estimated total cost of \$316,100.

Maryland 3-129-D

Fred W. Wheaton

Completed 1971
\$40,726

Oyster processing study - This study was to refine the engineering analysis of oyster processing, handling, and harvesting and to conduct theoretical and laboratory investigations of techniques to enhance labor productivity in harvesting, handling, processing, and transporting systems. New techniques and related equipment modules that improve overall aspects of oyster production were investigated also.

Engineering principles as applied to oyster processing problems - This project continued the State's efforts on analysis of harvesting, handling, and processing oysters, with emphasis on solving problems created by hand labor. The work was centered at University of Maryland, College Park.

North Carolina 2-100-R

Neil B. Webb

Completed 1972
\$50,000

The investigation of methods for improving and evaluating the quality of seafood products - The objective of this project was to develop methods of utilizing byproducts, as well as the sea products themselves, from the processing industry through temperature control systems, development of improved sanitation, and quality control.

North Carolina 2-197-R

George Giddings

\$16,700

Effects of post-harvest handling, processing, and storage on quality and properties of seafoods - This project will study the effects of post handling, processing and storage on selected marine fish tissue proteins and investigate means of control of microbial contamination in seafood processing plants. Work will be done in the Department of Food Science of North Carolina State University, Raleigh.

Ohio 4-65-R

Howard S. Teague

Completed 1971
\$50,000

Effect of whole fish meal on reproductive performance of swine - The objectives of this project were to determine the effect of two different dietary levels of whole fish meal on the reproductive efficiency of swine as assessed by number, weight, and vigor of baby pigs born, and livability and weight gains of the baby pigs to weaning age. Additionally, the effect of the dietary treatments on certain blood constituents which may affect the animal's reproductive ability was investigated.

Ohio 3-159-R

H.S. Teague

\$29,000

Physiological effects of fish meal on swine reproduction - The objectives are to determine the effect of whole fish meal consumption on physiological functions related to reproduction in the gilt and sow and the levels required to influence reproductive functions.

Oregon 1-58-D

David L. Crawford

Completed 1971
\$12,000

Development of new human food products from shad - Conventional methods of processing and preparing fishery products, such as canning, salting, pickling, and smoking, that are compatible with shad flesh were investigated. The use of commercial shad flesh from a deboning machine was investigated also.

Oregon 1-59-D

David L. Crawford

Completed 1973
\$50,000

Utilization of hake for human food - Hake for food for human use was investigated, with emphasis on the autoxidation of the oil and means of controlling rancidity and texture changes in fresh and frozen products.

Oregon 1-63-R

David L. Crawford

Completed 1973
\$44,250

Discoloration in fresh and frozen crab meat - Objectives were to improve methods and techniques in the handling and storage of Dungeness crab and crab meat and in maintaining the natural color and quality of canned crab meat.

Oregon 1-64-R

David L. Crawford

Completed 1971
\$18,000

Preparation of fish protein concentrate - Methods and procedures for the preparation of low-fat fish protein concentrate from machine-deboned and skinned, round, and eviscerated hake were investigated.

Oregon 1-67-D

David L. Crawford

Completed 1972
\$14,000

Utilization of dogfish for human food - The project was undertaken to examine the relative Hg levels of adult dogfish and test feasibility of reducing Hg levels in minced flesh by extraction.

Oregon 1-69-R

David L. Crawford

Completed 1973
\$44,000

Preparation of fish protein hydrolysates - Development and improvement of methods for preparing protein hydrolysates from fish fillet scrap and waste fish including hake and dogfish were investigated.

Oregon 1-89-D

David L. Crawford

\$45,500

Utilization of seafood industry waste - The purpose of this study is to develop information, methods and procedures that will promote the full and most economical utilization of seafood industrial waste materials.

Puerto Rico 2-104-R

W.D. Brown

Completed 1972
\$30,000

Investigation of green tuna meat - The main objectives were to conduct research which will lead to the development of techniques by which the "green" fish condition can be predetermined, the cause and prevention, if possible, of this condition, and its control and/or neutralization--specifically, research on "freeze-enhanced oxidation of tuna pigments."

Puerto Rico 2-159-R

Walter A. Mercer

\$31,500

Survey of micro-constituents in canned seafood and development of protective procedures
This project is subcontracted to Tuna Research Foundation to survey the occurrence of mercury in various species of tuna, to design adequate sampling procedures for raw fish with respect to mercury and other micro-constituents, and to attempt a reduction of the mercury content of tuna fish prior to canning.

MARKET DEVELOPMENT

Eleven projects have been funded in 5 States to effect greater use of seafoods and fishery byproducts. Of the projects funded, 6 have been completed at a total cost (both State and Federal) of more than \$1.5 million and 5 are continuing at various stages of completion at a total estimated cost of \$1,454,370.

Florida 2-125-D

G.C. Shuman, Jr.

Completed 1971
\$213,100

Fisheries marketing and extension service - The purpose of this project was to effect a free flow of commercial fisheries products in national trade channels in coordination and cooperation with industry, trade associations, and others.

Florida 2-191-D

Frances Felsburg

\$141,577

Fisheries extension and marketing services - Project objectives are to initiate extension program designed to teach professional foods people the techniques of fish cookery; proper handling, storing, and preparing fish; and ways to maintain and expand consumer demand for fishery products.

Maine 3-115-D

George H. Taylor

Completed 1973
\$131,100

Market development - The objectives of this project were to improve market conditions and to increase the sale of Maine seafood products. This program was developed in close cooperation with producers, processors, wholesalers, retailers, and consumers. Since neither the fishermen nor any of the various middlemen could exist without the consumer, primary emphasis was placed on the development and use of consumer education techniques.

Maine 3-176-D

George H. Taylor

\$50,000

Market development - This project is to expand existing markets and to develop new markets for Maine seafood products through three major activities: (1) audiovisual; (2) marketing data and products development; and (3) information and education.

Maryland 3-66-D

Gordon P. Hallock

Completed 1971
\$493,800

Market development for Chesapeake Bay seafoods - Under this project Maryland worked closely with the seafood industry and users to effect greater use of Chesapeake Bay seafoods by volume-feeding establishments and the general consumer. Educational materials such as video tapes, films, and recipe booklets suitable for restaurant and retail store seafood productions were developed.

Maryland 3-132-D

Gordon P. Hallock

Completed 1973
\$369,340

Maryland seafood marketing - The objective of this project was to develop marketing opportunities for Chesapeake Bay seafood industry oysters, crabs, clams, rockfish, shad, herring, sea squab, and eels.

Maryland 3-184-D

Gordon P. Hallock

\$78,850

Maryland seafood marketing - The purpose is to develop marketing opportunities for Chesapeake Bay seafood, which includes a major consumer preference survey, emphasis on mass feeders, a packaging research study, and a transportation study.

Massachusetts 3-136-D

Hugh F. O'Rourke

Completed 1973
\$299,199

Massachusetts fisheries marketing program - The objectives of this project were to educate and inform volume-feeding operators about Massachusetts fish and shellfish and correct serious supply and demand imbalances.

Massachusetts 3-199-D

Hugh F. O'Rourke

\$99,000

Massachusetts fisheries marketing program - This project continues the State's efforts to educate and inform volume-feeding operators about fish and shellfish and to correct serious supply and demand imbalances.

Virginia 3-125-D

Jack L. Wright

Completed 1972
\$80,000

Virginia seafood marketing - The objective of this project was to increase utilization of products of the sea, with emphasis on blue crabs, oysters, and clams.

Virginia 3-164-D

Virginia Seafood Council Staff

\$40,000

Virginia seafood marketing - The purpose of this project is to assist the Virginia fishing industry in improving the quality and production of fishery products and to increase the institutional use of seafood.

OPERATION AND MAINTENANCE

Eight projects have been funded for operation and maintenance of laboratories and fish production facilities and fish screens constructed under the program. Of the projects funded, 4 have been completed at a total cost (both State and Federal) of \$473,600 and 4 are continuing at a total estimated cost of \$1,038,800.

California AFSC-15

Robert D. Will

\$288,800

Mad River fish hatchery operations - Provides for operation and maintenance of the Mad River fish hatchery to augment north coastal fisheries for steelhead and salmon by rearing and releasing annually 1 million yearling steelhead and silver salmon in combination and 5 million king salmon. This hatchery, located in Humboldt County, was constructed under the program.

California AFC-16

\$178,000

Operation and maintenance of fish screens - Fish screens constructed under P.L. 89-304 will be operated and maintained. Also, the efficiencies of the screen will be evaluated.

Maine 3-201-D

John W. Hurst

\$21,000

Operation and maintenance of marine laboratory, West Boothbay Harbor, Maine - This project will provide personnel and supporting costs necessary to assist in the operation and maintenance of the buildings, grounds, and equipment at the Marine Research Laboratory built under project 3-83-C.

New York 3-95-D

Albert C. Jensen

Completed 1972
\$107,000

Operation and maintenance of marine laboratory - This project provided operational funds for the newly constructed marine laboratory at Flax Pond. The laboratory, built under project 3-10-C, includes wet and dry laboratories along with salt- and freshwater systems and related equipment.

New York 3-161-D

Albert C. Jensen

\$57,600

Operation and maintenance of marine laboratory, Flax Pond, Old Field - This project is a continuation of project 3-95-D for operation and maintenance of the laboratory for 3 years at an annual cost of about \$48,000.

Oregon AFC-45

Kelly R. Conover

Completed 1973
\$107,100

Rear and release salmonids at the Trask River rearing pond - Provided for operation of 1/3-acre salmon rearing pond on the East Fork of Trask River. About one-half million coho smolts were reared and released in the East Fork or adjacent streams.

Oregon AFC-47

Carl Copper

Completed 1973
\$183,000

Operation of the Elk River salmon hatchery - Objectives were to collect and spawn adult salmon, receive eggs from other hatcheries, incubate the eggs, and rear the resulting fingerlings for release in Elk River and adjacent streams. Annual production is about 1 million yearlings comprised of fall chinook, coho, and steelhead.

Oregon AFC-49

Carl Copper

Completed 1973
\$76,500

Operation of rearing ponds - North Nehalem River salmon hatchery - Objectives were to collect and spawn adult salmon, receive eggs from other hatcheries, incubate eggs, and rear resulting fingerlings for release into North Nehalem River or adjacent streams.

PLANNING

Fifteen projects for development of research plans, reporting system, maps, stream catalogs, and inventories to assist the States in management of their fishery resources and supporting environments have been funded in 9 States and the Virgin Islands. Of these projects, 10 have been completed at a total cost (both State and Federal) of \$422,828 and 5 are continuing at a total cost of \$433,800.

Alabama 2-143-R

Edwin B. May

Completed 1971
\$7,830

Evaluation and planning of Alabama's marine resources and research and development requirements - Plans for research and development programs related to specific fisheries problems and establishing objectives and priorities in accordance with available funds and facilities were developed.

Alabama 2-207-R

Hugh A. Swingle

\$14,000

Regulation of coastal zone development for fisheries management - The objectives of this study are to compile available laws, guidelines, and policies from other States regarding coastal zone developments and evaluate these data as related to comprehensive and equitable guidelines for Alabama.

Arkansas 4-12-D

William M. Bailey

Completed 1971

\$49,060

Commercial fishery industry survey - The purpose of this study was to develop a statistical reporting system for all the commercial fisheries in the State of Arkansas. Fish farmers and commercial fishermen were interviewed to establish the base for refined surveys.

California AFC-14

Stanley Kable

\$70,000

Enhancement of anadromous fisheries resources - To plan, review, and evaluate anadromous fish research.

Louisiana 2-190-R

Charles White

\$98,000

Development of an area management concept for Gulf penaeid shrimp - The purpose of this study is to develop a data base for implementation of shrimp management on an area basis rather than the present Statewide basis. Also, information would be obtained to correlate relationships between selected hydrological conditions and penaeid shrimp populations.

Maine FWAC-2

Phillip Goggins

\$48,116

Statewide comprehensive fish, wildlife, and marine management plan - Provide for development of a management plan which will maintain at an optimum level through biological and ecological research on fish and wildlife resources.

Maine AFSC-13

Robert L. Dow

Completed 1972

\$42,412

Statewide comprehensive fish, wildlife, and marine management plan - The objective of this project was the formulation of a Statewide plan to provide for the conservation, including natural use, of the marine fish resources.

Michigan AFSC-8

Ron Rybicki

Completed 1971

\$120,000

Great Lakes fish resource development study - This project was undertaken to develop a study outline for an evaluation of the current fisheries management programs on Lakes Huron, Michigan, and Superior.

North Carolina 2-139-R

Walter F. Godwin

Completed 1971

\$14,930

Plan for fisheries resources research and development, North Carolina - Under the project the relative status of the commercial fisheries and needs were determined and a 5-year research and development plan was developed.

North Carolina 2-175-R

Maurly Wolff

Completed 1974

\$100,000

Survey of nursery areas in western Pamlico Sound - This project supplemented the State's effort to obtain current information on the important fishery resources and to map the waters supporting them. Nursery grounds utilized by these species were identified and mapped.

Oklahoma 2-140-R

Gary Mensinger

Completed 1972

\$2,880

Planning for the development of the commercial fishery in Oklahoma - Problems related to reservoir-type commercial fisheries were identified based on accumulated information under completed projects. Then, a program plan was developed around potential fisheries for minnows, freshwater mussels, and fish farming.

Planning for Virgin Islands fisheries program - To reconcile the Island's biological, economic, social, and political factors into a workable plan that will provide maximum benefits to the fisheries, a plan was developed for implementing a 5-year program of research and development.

Washington AFC-37

Walt Williams

Completed 1971
\$52,000

Stream catalog - Puget Sound and Chehalis region - Accumulated information gathered in the Puget Sound and Chehalis River Basin resource study concerning physical and environmental stream characteristics and anadromous fish species utilization in the watersheds of Puget Sound and Chehalis drainage systems was cataloged.

Washington AFC-40

Russell Jones

Completed 1971
\$67,000

Design for future program construction - Construction plans, specifications, and cost estimates were prepared for about nine projects scheduled to be undertaken under P.L. 89-304.

Washington AFC-51

Marshall Thayer

Completed 1972
\$132,000

Design for Humptulips salmon hatchery - A design for a salmon hatchery with an initial capacity for production of 100,000 pounds of young salmon was completed. The proposed station would be located on Humptulips River, Grays Harbor County.

Washington AFC-60

Walt Williams

\$16,000

Coastal stream catalogue assembly - Accurate maps with descriptions of coastal streams, excluding Grays Harbor drainage, are prepared to aid in development of research plans.

Washington AFC-68

R.W. Williams

\$35,000

Public coastal stream catalog - This project provides assistance to publish the accumulated information concerning physical and environmental stream characteristics and anadromous fish species utilization of all the State's coastal drainages that were collected under State-Federal financial projects.

Washington AFC-69

R.W. Williams

\$48,000

Publish stream catalog, Puget Sound and Chehalis regions - To publish a stream catalog of accumulated information that was collected under State-Federal financial projects concerning physical and environmental stream characteristics and anadromous fish species utilization of all drainages of Puget Sound.

RESEARCH

Research is the backbone of the program where almost \$26 million or about 54 percent of the funds are used. A total of 243 research projects have been approved and funded. Of these, 26 are concerned with the environment, 48 with freshwater finfish, 101 with marine finfish, 2 with marine worms, and 66 with shellfish.

ENVIRONMENTEstuarine:

Alabama 2-119-R

Edward Bault

Completed 1971
\$12,100

A survey of the benthic organisms in coastal streams and brackish waters of Alabama - The distribution and abundance of benthic animals in coastal streams and low-salinity water in Baldwin and Mobile Counties were determined. Also, the distribution and abundance of these animals to hydrological and polluted conditions and to what extent they are utilized as food by commercial fish species were investigated.

Alabama 2-149-R

Eddie B. May

Completed 1973
\$61,000

The circulation and tidal flushing of Alabama's estuaries and the effect of shell dredging on suspended solids - This project provided for a study of the flushing rate and flow patterns in Mobile Bay estuaries as related to pollution and the dispersion of suspended solids in shell dredging areas as related to sedimentation.

Studies on the ecology of Georgia's estuarine waters - This project provided for a study of the composition, distribution, and abundance of principal species of commercial fish inhabiting or utilizing estuarine environment along the Georgia coast. Ecological and biological factors associated with the species activities were investigated also.

Louisiana 2-168-R

Conrad L. Juneau

\$46,000

An inventory and study of the Vermilion Bay-Atchafalaya Bay estuarine complex - Information is obtained on the composition and abundance of important fauna, physical and chemical characteristics, and sediment distribution pattern in the estuarine waters of the Vermilion Bay-Atchafalaya Bay complex.

Louisiana 2-188-R

Johnie W. Tarver

\$32,000

An inventory and study of the Lake Pontchartrain-Lake Maurepas estuarine complex - The purpose of this study is to investigate the composition, general distribution, and relative abundance of commercially or potentially important fauna in an estuarine area adjacent to the City of New Orleans which is subject to a variety of stresses such as filling for construction and development, dredging, and pollution from oil and gas wells.

Louisiana 2-189-R

Gerald Adkins

\$44,000

A study of the fauna in dredged canals of coastal Louisiana - Information is being obtained on the composition, general distribution, and relative abundance of the fauna, and on selected chemical and physical parameters, in dredged canals so that relationships between the environment and the fauna can be determined.

Maine 3-170-R

D.E. Nelson

\$20,000

Escalator dredge study - This project is undertaken to define present sediment conditions and status of marine plants and animals in subtidal and intertidal areas where there are known to be populations of clams. After the initial investigation, the areas will be dredged to investigate the effects of the dredging on the marine life and the environment within and adjacent areas.

Maine 3-205-R

Peter F. Larsen

\$15,200

Benthos study of the Sheepscot River Estuary - This project will resurvey two areas sampled in 1955 to evaluate the benthic community for any alterations which may have occurred in the intervening years and to analyze data by methods not available previously, so that this survey may be used as a baseline against which to compare the effects of future changes.

Maryland 3-93-R

H.T. Pfitzenmeyer

Completed 1971
\$50,000

Effects of Maryland hydraulic dredge on softshell clams - This project was to determine how seasonal hydraulic clam dredging affects present population and recruitment of juvenile soft-shell clams. An area of the Maryland portion of Chesapeake Bay was used for the removal of clams and mechanical disruption of the bottom.

Maryland AFC-5

J.R. Schubel

Completed 1971
\$85,000

Suspended sediments in Chesapeake Bay - The effects of suspended sediments on the development of anadromous fish eggs and larvae in Upper Chesapeake Bay and the source and characteristics of these sediments were investigated.

New Jersey 3-114-R

Sidney S. Herman

Completed 1971
\$21,313

A study of the base food chain relationships in coastal salt marsh ecosystems - This study was to evaluate the meiobenthic communities, their abundance, composition, and distribution, relative to the physical and chemical conditions of the overlying water and the sediment.

New Jersey 3-137-R

Paul E. Hamer

Completed 1974
\$259,000

Inventory of major estuarine systems - The species of fish which inhabit estuaries and their distribution, the chemical and physical attributes of the estuaries, and the uses man makes of these waters were determined.

Estuary resource surveys - A resource use survey was made in 16 estuaries along the Oregon coast, including an assessment of the potential contribution of clams to the fisheries. These data were used to build up the Fish Commission's defense of these areas against loss by industrialization and other developments.

Puerto Rico 2-153-R

Robert Y. Ting

Completed 1972
\$42,000

The determination of mercury in commercially important aquatic organisms - The purpose of this study was to examine the possible pathway of concentrations of mercury found in commercially important fish, except tuna, and invertebrates and to determine levels of concentration.

Texas 2-112-R

Roy B. Johnson, Jr.

Completed 1972
\$67,536

Ecological changes associated with the industrialization of Cedar Bayou and Trinity Bay, Texas - The ecological changes brought about by discharge of waste from a steel mill into the lower reaches of Cedar Bayou were determined. Also investigated were the effects of channel development and reversal of flow in the Bayou by the power company, and the effects of effluent from the power station on the ecology in Trinity Bay.

Texas 2-155-D

Richard L. Benefield

Completed 1973
\$38,771

Evaluation of effects of various coastal construction methods - This project was to determine the best procedure for marine construction work in estuarine areas for minimal habitat destruction along the Texas Gulf coast and produce a manual with guidelines for processing marine construction permits.

Texas 2-160-R

Edward Bradley

\$80,156

Determination of freshwater quantity standards for the Guadalupe estuary and San Antonio Bay system, Texas - Objective of this study is to obtain information to establish water allotments and water quantity standards for the Guadalupe estuary.

Texas 2-200-R

Roy Johnson

\$27,100

Fishery survey of Cedar Lakes and the Brazos and San Bernard estuaries - This project will investigate the biota and hydrography of the estuaries; survey nursery habitat, the fishery status and potential; and recommend procedures to maintain and/or improve fishery habitat.

Washington AFC-59

Roy C. Johnson

Completed 1973
\$22,000

Spawning ground improvement - gravel loosening - The objective of this study was to develop techniques for improving stream gravel areas where potential salmon egg production exists but siltation precludes successful spawning or survival of deposited eggs. Studies were made in Dungeness and Stillaguamish Rivers entering Puget Sound in pink and chum salmon production areas.

Freshwater:

Alaska 5-28-R

Alan P. Kingsbury

Completed 1972
\$73,600

Relationships between logging activities and salmon production - This study continued work completed under 5-24-R. It shifted objectives and methodology in that results obtained will be used to guide logging plans to minimize adverse effects on salmon.

Alaska AFC-30

John Solf

\$84,300

Stream rehabilitation, Prince William Sound - The objectives of this project are to continue restoration of earthquake-destroyed pink and chum salmon runs in Prince William Sound and rehabilitation of spawning areas where production has been seriously curtailed. Thus far under project AFC-3, 29 streams have received remedial treatment through an effective stream improvement program. Under this project, restoration of 25 damaged streams is underway and restocking has begun where necessary to rebuild runs.

Influence of pump storage and generation on commercial fisheries potential of reservoir - Objectives of this study are to determine the effects on fishes and their habitat of a pump storage regulation system installed in two dams in the Salt River chain, and to obtain data concerning pump storage and its value in the planning and construction of similar units from the standpoint of aquatic resource values.

Arkansas 2-166-R

R.V. Kilambi

\$30,500

Effects of cage culture fish production upon the biotic and abiotic environment of Crystal Lake - Before and after cage culture of catfish and trout fish populations, water quality, and bottom fauna will be measured to note changes.

Kentucky 4-48-R

Hunter M. Hancock

Completed 1972

\$60,000

Influence of the effluent from a concentrated industrial complex on a large river - Murray State University made a 2-year study to determine how effluent released into the Tennessee River affects the distribution of fish, water quality, and the chemical composition of bottom muds, benthos, and fish tissue.

North Dakota 4-55-R

John Owen

Completed 1973

\$75,000

A determination of nutrient exchanges and bio-chemical nutrient removal from Lake Ashtabula, North Dakota - Sources of nitrates and phosphates and nutrient exchanges were determined, the purpose being to gain information to assist in the development of a long-term management plan for Lake Ashtabula relative to yellow perch and bullhead fisheries.

Oregon AFC-46

James D. Hall

Completed 1973

\$83,000

Effects of logging on abundance of coho salmon - This study was part of the Alsea Watershed Program designed to determine the effects of Douglas fir logging practices on the physical and biotic resources in small coastal watersheds. This project determined the effects of timber harvest (clearcut vs. patchcut) on coho salmon rearing capacity of selected streams.

Tennessee 2-142-R

Eung Bia Shin

Completed 1972

\$20,000

Mechanisms of mercury transformation in bottom sediments - The project was undertaken at Vanderbilt University to determine the mechanisms by which the various forms of mercury are transformed into compounds such as methyl mercury, whether the type of soil is a factor in the process, and the detention time of mercury and its compounds in a lake or reservoir.

Marine:

New York 3-182-R

Richard E. Fox

\$28,500

Primary productivity and basic food chain relationships in two Long Island Bays - The purpose of this study is to obtain and compare chemical, physical, and other ecological characteristics of two adjacent marine environments as related to primary production and basic food chain structures.

FINFISH (FRESHWATER)

Baitfish:

Arkansas 2-162-R

Raj V. Kilambi

Completed 1973

\$50,000

Effects of quality and quantity of food on golden shiner production - Growth of golden shiner in relation to quality and quantity of commercial diets and stocking densities under different water temperatures was determined. Research was done at the University of Arkansas, Fayetteville.

Nevada 6-9-D

James E. Deacon

\$25,545

Rearing baitfishes in the desert Southwest - This project is designed to determine the present volume and value of baitfish by species and the present sources and capability for expansion and to estimate future market needs based on present and projected visitor-use of the Lake Mead Recreation Area. Nevada Southern University is making this study.

West Virginia 3-173-R

Carl B. Schreck

\$19,188

Impact of commercial use of wild bait species - The impact of commercial harvest of natural populations of bait species in Rich Creek, tributary of New River, will be evaluated and the effects on population structure determined.

Buffalofish and carp:

Arizona 6-11-R

W.L. Minckley

Completed 1972
\$72,240

Commercial fisheries potential of reservoirs - This was a continuation of project 6-1-R to investigate the populations of buffalofish, carp, and threadfin shad in reservoirs in central Arizona and lower Colorado River and Lake Mead.

Kentucky 2-228-R

Robert Hoyt

\$10,300

Population dynamics and catch susceptibility of smallmouth buffalo in Rough River reservoirs - This project will study the populations of smallmouth buffalo fish in the Rough River reservoirs to determine population size, percentage of marketable fish, movement and distribution, and efficient harvest gear.

New Mexico 6-11-R

Douglas B. Jester

Completed 1972
\$58,000

Investigation on commercial fishery potential of rough fish species - New Mexico State University gathered and analyzed data to determine the feasible utilization of underused fish species in Elephant Butte and Caballo Reservoirs. The population structure, growth characteristics, seasonal movement, concentrations, and harvest methods for the buffalo-fishes, river carpsucker, carp, and gizzard shad were investigated also.

New Mexico 2-198-R

Douglas B. Jester

\$18,186

Experimental harvest of "rough" fishes from Elephant Butte Lake, New Mexico - The effects of various baits on catch rates of fishes in gill nets will be investigated and the effects of selective harvest of small-mouth buffalo, river carpsucker, and carp on fish populations will be determined.

Wyoming 1-48-R

George T. Baxter

Completed 1971
\$121,616

Commercial potential of non-game species in impounded waters - University of Wyoming made population studies at Ocean Lake and Seminoe Reservoir to estimate the potential abundance on non-game fish species, primarily carp and white sucker.

Channel catfish and bullhead:

Arkansas 4-53-R

R.V. Kilambi

Completed 1971
\$28,000

Influence of temperature and photoperiod on growth, food consumption, and food conversion efficiency on blue catfish, *Ictalurus furcatus* (Lacueur) - This project provided for an evaluation of the influence of temperature and photoperiod on growth, food consumption, and food conversion efficiency of the fingerling blue catfish and an investigation of the changes in the above processes brought about by the age of the experimental fish.

Illinois 4-50-R

William M. Lewis

Completed 1972
\$51,120

Significance of ionic content of water in determining the growth and handling quality of channel catfish - Determined if the various dissolved salts in water have a detectable effect upon the growth and handling quality of channel catfish under conditions of dense populations characteristic of fish farming.

Channel catfish investigations - Project objectives are to determine causes for variation in year class strength of channel catfish in pools 9, 11, 13, and 18 of the upper Mississippi River. Also, a survey technique for assessment of year-class abundance of commercial harvest will be developed and evaluated.

Kansas 4-45-R

O.W. Tiemeier and C.W. Deyoe

Completed 1971
\$72,340

Investigations on nutrition and metabolism of catfish and utilization of fisheries products - This study, subcontracted to Kansas State University, provided additional information on the nutritional factors affecting channel catfish. Carbohydrate and energy utilization during feeding, during the period of nonfeeding, and under varying temperature conditions was studied. Experiments on protein metabolism were also underway.

Kansas 2-170-R

O.W. Tiemeier and C.W. Deyoe

\$29,720

Investigation on nutrition and metabolism of the channel catfish - This study will add knowledge to feed requirements and evaluate new feedstuffs as nutrient source for channel catfish.

Kentucky 4-70-R

Hunter M. Hancock

Completed 1972
\$9,000

Kentucky Lake commercial catfish catch analysis - Commercial catch composition, age, growth, and condition of Kentucky Lake catfish were investigated by Murray State University Biological Station.

Missouri 2-164-R

Eugene McDonald

Completed 1972
\$4,807

Influence of light intensity on food conversion of channel catfish - Four experimental troughs were used at light intensities of total darkness, low, intermediate, and full to determine if feeding rate of channel catfish is a function of light intensity. Duplicate lots of 9-inch and 3-inch fish were stocked at each intensity and held for 21 days' observation.

Missouri 2-187-R

W.A. Rogers

\$8,667

Anatomical and histological description of the channel catfish - The objective of this study is to describe the gross anatomy of the channel catfish, including histological description of the tissues in the integument, gills, alimentary tract, liver, spleen, heart, blood, kidney, gonads, urinary bladder, gall bladder, musculature, and skeletal system.

North Dakota 4-69-R

John Owen

Completed 1973
\$25,500

Lake Sakakawea commercial fisheries investigations - The objectives of this project were to study the movement of channel catfish, basic biology of the river carpsucker in Lake Sakakawea, and growth of goldeye in Lakes Sakakawea and Oahe.

North Dakota 1-85-R

J.R. Reilly

\$11,500

Lake Sakakawea commercial fishery investigations - This project has three objectives: (1) investigate the reproduction, movements and biological characteristics of channel catfish in the Little Missouri River, (2) obtain information on the population structure of buffalo fishes in Lake Sakakawea, and (3) to assemble papers on the goldeye into a single comprehensive publication which will compile data gathered by the University of North Dakota under P.L. 88-309.

Oklahoma 4-60-R

Robert Summerfelt

Completed 1971
\$34,000

Flathead catfish movements - The homing range and the homing ability of flathead catfish and environmental factors which influence this species' activities and movements were investigated. Also, population density, fishing, and natural mortality were determined.

Wisconsin 3-166-R

Richard Ranthum

Completed 1974
\$12,000

Effects of commercial fishing on winter congregations of catfish - The objective of this study was to determine if present commercial fishing regulations governing winter catfish congregations are effective in providing a stable catfish fishery in Pool 7 of the Mississippi River. Population estimates and contribution to the catch by various gears were determined.

Lake herring:

Michigan 4-59-R

Myrl Keller

Completed 1972
\$143,000

Lake trout restoration studies - Objectives of the study were to assess and describe condition of introduced lake trout stocks in Michigan waters of Lake Michigan. Evaluation of the stocks proceeded in conjunction with programs to control sea lamprey and reestablish lake trout and other salmonid species.

Michigan 3-168-R

Leon V. Moffit

\$37,997

Assessment of lake trout populations in Lake Michigan - This study is a continuation of project 4-59-R to evaluate progress and effectiveness of sea lamprey control on lake trout stocks in Michigan waters of Lake Michigan, and to determine survival of planted lake trout as affected by exploitation by commercial and sport fisheries, and predation.

Minnesota 4-38-R

Charles Burrows

Completed 1971
\$37,500

Lake Superior commercial fisheries assessment studies - The primary aim of this work was to ascertain the condition of the lake trout and other commercial fish stocks in Minnesota waters of Lake Superior. To meet this aim, the progress and effectiveness of sea lamprey control in local areas and the survival and dispersal of stocked lake trout were investigated. The abundance and distribution of other commercial fish populations, as well as the commercial production, were also investigated.

Minnesota 3-151-R

Charles Burrows

\$21,000

Lake Superior commercial fisheries assessment studies - The objectives of this study are to determine effectiveness of lamprey control on lake trout stocks in local areas, survival and dispersal of stocked lake trout, size and age distribution of trout and other commercial species, and natural reproduction in lake trout stocks.

Northern pike:

Iowa 2-225-R

James Meyhew

\$15,000

Northern pike investigations - This research is to determine the vital statistics including abundance, age structure, size distribution, growth, mortality, fecundity, and seasonal movement along with the market and harvest potential in four pools in the upper Mississippi River bordering Iowa.

Paddlefish:

South Dakota 4-61-R

Charles Backlund

Completed 1971
\$8,800

Paddlefish population study - Information was obtained for management to maintain a balanced harvest of paddlefish based on the potential of the resource.

Rainbow trout:

Utah 6-10-R

Clair B. Stalnaker

Completed 1971
\$42,000

Investigation of the intensity of natural selection upon different phenotypes (bloodtypes) of rainbow trout in commercial trout rearing ponds and reservoirs - Work was carried out at the State's Experimental Fish Hatchery, Logan, and Utah State University Fisheries Laboratory. The major aim was to eliminate undesirable genotypes from breeding populations.

Utah 6-13-R

Clair B. Stalnaker

Completed 1973
\$46,056

Genetic studies of rainbow trout strains being maintained by commercial and agency hatcheries - This project continued the State's research effort to upgrade techniques used in production of rainbow trout at hatcheries through selective breeding. The work was done at the Utah State University, Logan.

Physiological-genetic studies of trout strains being maintained by commercial and agency hatcheries - The purpose of this study is to examine genetic variations among trout by electrophoretic analysis of protein components and enzyme systems. Environmental influences upon trout such as ph, salinity, and alkalinity will be studied by sampling isolated populations of trout and conducting blood chemistry analyses.

Suckers:

North Dakota 4-54-R

John Owen

Completed 1971
\$3,500

Investigation of gonadatrophins in stimulating spawning in white suckers - The controlled spawning of white suckers was investigated as a possible means of obtaining bait minnows commercially. Of the intramuscular injections used, only fresh and dried pituitary and the HCG proved successful in inducing spawning.

Whitefish:

Wisconsin 3-169-R

Ronald J. Poff

\$18,000

Assessment of whitefish and related species in Lakes Michigan and Superior - The purpose of this study is to obtain biological information on whitefish by monitoring commercial catches, maintaining index stations on spawning reefs, and assessing juvenile abundance.

Others:

Colorado 1-100-R

Stephen A. Flickinger

\$25,500

Culture, survival, and economics of commercially important game fishes - The purpose of this study is to develop culture techniques that are suited to commercial propagation of warmwater game fish.

Indiana 3-150-R

Thomas S. McComish

Completed 1974
\$75,600

Interspecies relationships of fish in Indiana waters of Lake Michigan - Biological data were collected on the fishery resources of Lake Michigan waters of Indiana to fill a void that exists in the Great Lakes States and Fishery Commission efforts to obtain information for a better understanding of the fish population dynamics, status of the stocks, and their relationships.

Iowa 4-11-R

James Mayhew

Completed 1972
\$161,000

Industrial and commercial food fish investigations - Evaluations were made of the potential yield of fish with commercial and industrial value in large inland streams and reservoirs. Methods were developed to properly use these fish.

Kentucky 2-186-R

John C. Williams

Completed 1974
\$69,000

Commercial fishery investigation of the Kentucky River - The purposes of this project were to determine the commercial fishery potential of the finfish and mussel fisheries in the Kentucky River and its three main tributaries, the North Fork, Middle Fork, and South Fork, and to evaluate the effects of selected pollutants on these resources.

Maryland AFC-8

C.J. O'Dell

\$126,300

Survey of anadromous fish spawning areas - The purpose of this project is to conduct an inventory of streams in Maryland to determine which support or have potential to support spawning runs.

Minnesota 4-39-R

Charles Burrows

Completed 1971
\$105,978

Minnesota commercial fisheries improvement - Factors determining the commercial catch of burbot, sauger, tullibee, and yellow pike in the American waters of Lake of the Woods were investigated. Catches were examined to determine the condition of the fish and size groups harvested.

Minnesota 3-143-R

Lloyd L. Smith

Completed 1973
\$41,639

Factor determining the relationships of the burbot and other associated species in Minnesota waters - Provided for an evaluation of the potential commercial importance of the burbot in the American waters of Lake of the Woods and its relationship with the production of other species such as walleye and sauger which support existing commercial fisheries in Minnesota waters.

Montana 1-56-D

James E. Liebelt

Completed 1973
\$75,900

Commercial fisheries of Fort Peck Reservoir - Information on the life history, distribution, abundance, and availability of goldeye and buffalofish was obtained in Fort Peck Reservoir on the Missouri River.

Nebraska 4-57-R

Monte Madsen

Completed 1972
\$88,000

Commercial fishery investigations - The primary objective of this project was to determine the potential and feasibility of a commercial fishery on the North Platte River.

Nebraska 2-196-R

Monte Madsen

Completed 1973
\$12,000

Evaluation of an electric weir as a harvest method for commercial fish - This study was designed to evaluate the fish harvest efficiency of the Lewellen weir on the McConaughy Reservoir by use of a downstream trapping device and mark and recapture program.

Nebraska 2-226-R

Larry Messman

\$16,500

Inland commercial fisheries harvest - Catch statistics will be collected from all the commercial landings on three inland reservoirs to provide a basis for evaluating and making management and resource-related decisions.

Pennsylvania 3-167-R

Roger Kenyon

\$91,320

A commercial fish study of the Eastern Basin of Lake Erie - The objective of this study is to assess the structure and status of the smelt and forage fish populations in the Eastern Basin of Lake Erie and to study the stability of yellow perch year classes.

Tennessee 2-219-R

J.R. McDearman

\$26,200

Ultrasonic fish tagging system development - The objective of this study is to develop an ultrasonic fish tag and an associated monitoring system which would allow researchers to track a fish for a period of several years.

Utah 1-82-R

Joseph R. White

Completed 1974
\$40,000

Commercial fisheries in typical large shallow eutrophic Rocky Mountain Lake - The potential for expanding the commercial fishery to bullhead in a Utah lake was investigated. Also, the statistics on the sucker and carp fisheries were studied to evaluate the apparent decline in abundance of these fish.

West Virginia 3-128-R

Robert Mills

Completed 1973
\$20,000

Commercial fishery investigations - Provided for sampling fish from the Ohio River and major tributaries for mercury and other heavy metal concentrations.

West Virginia 3-200-R

Robert Mills

\$6,000

Commercial fishery investigations - Objective is to monitor the chemical and pesticide levels in commercial fishes in the West Virginia section of the Ohio River.

Feasibility of commercial exploitation of fish in impoundments - This project will evaluate the effect of commercial exploitation on the populations of species, such as yellow perch, and commercial species of carp, sucker, and buffalofish in Ocean Lake and Seminole Reservoirs. Information will be obtained on methods of fishing and dollar investment also.

FINFISH (MARINE)

Alewife and blueback herring:

Connecticut AFC-7	William Lund, Jr.	Completed 1973 \$53,200
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Estimating the number of river herring in the Connecticut River - River herrings (alewife and blueback herring) were captured by pound net in lower Connecticut River, marked, and released to estimate abundance and evaluate the potential for commercial fishery on the species.

Illinois AFC-2	Harry Cook	Completed 1972 \$33,000
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Histology of the thyroid and pituitary glands in the alewife - The thyroid and pituitary glands in alewife were studied on a seasonal basis in an effort to determine whether there are differences in these glands between freshwater and marine fish stocks.

Maine AFC-14	C.J. Walton	\$35,100
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Development and management of alewife, blueback, and shad resources - The overall objective of this study is to develop and manage the alewife and blueback herring resources in Maine's coastal streams. The immediate work is to determine the feasibility of using mechanical or truck-stocking procedures to develop and enhance runs of these fish.

Maine AFC-16	Clement J. Walton	\$32,400
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Population biology and management of the alewife, *Alosa pseudoharengus*, in Maine - The purpose of this study is to develop an alewife management program through research on the biology and population dynamics of coastal Maine alewife stocks. Sampling program of alewife runs in the Damariscotta and St. George River initiated under project AFC-14 will continue with the addition of another run to compare with previous data.

Massachusetts AFC-12	Charles F. Cole	\$11,000
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Biological assessment of the alewife population, Parker River, Massachusetts - The purpose of this study is to estimate size, movement, and selected biological parameters of the spawning runs of alewife in the Palmer River, and correlate physical and chemical parameters to timing, size, and numbers of fish passing through the system.

New Jersey AFC-2	Robert H. Soldwedel	\$7,800
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Anadromous fish inventory - The objective of this study is to obtain information on spawning areas of river herring and American shad in coastal streams, and on the timing and size of runs of these fish.

Virginia AFC-7	Jackson Davis	\$180,000
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Biology and management of river herring and shad - To develop a sound biological basis for management of anadromous fish in a period of increasing multiple use of estuarine spawning grounds and nurseries and increasing exploitation.

Wisconsin AFC-5	Carroll R. Norden	Completed 1971 \$55,930
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An investigation of the reproductive cycle of the alewife in Lake Michigan - The growth and maturation of the gonads of alewife collected from Lake Michigan were studied. Histological preparations of the gonads were used to describe and compare developmental stages as they occur in young-of-the-year, age group I, age group II, and older fish.

Mucus and osmoregulation in alewife and smelt - Seasonal cycles in mucus cell function in alewife and smelt as related to ancestral patterns of anadromous migration were studied, and the effects of thermal stress upon mucous cell function and relationship between changes in the productive mucous coat and osmoregulatory failure as a cause of mass mortality in alewife were determined.

American shad:

Connecticut AFC-6

Peter Mints

Completed 1973
\$66,000

A study of the migratory behavior of American shad - The purpose of this study was to investigate the orientation and migratory behavior of shad in Long Island Sound and at the mouth of the Connecticut River. To study mechanisms of orientation, individual fish were fitted with eye caps, had their nostrils plugged, and/or had their lateral line sensors destroyed, and tracking was done by electrical tracking gear and dart tags.

Connecticut AFC-8

W.C. Leggett

\$9,000

A study of the weight loss in American shad during the freshwater migration - This study is undertaken by the Essex Marine Laboratory to determine weight loss of adult American shad during freshwater spawning migration in the Connecticut River, and the extent and source of the migration in terms of weight loss.

Florida AFC-2

Edwin Joyce, Jr.

Completed 1971
\$94,240

Investigations on the American shad in the St. Johns River - Abundance, seasonal migration, spawning activities, and other pertinent biological information were determined for American shad in the St. Johns River. An assessment of the possible effects of silt, pollution, physical disturbances, and fishing pressure was attempted also.

Oregon AFC-53

Alan M. McGie

Completed 1973
\$61,500

Shad and striped bass management study - Catch statistics, fishing intensity, and catch-per-effort data for shad and striped bass were collected on the Siuslaw, Umpqua, Smith, Coos, and Coquille Rivers. Data will be used to estimate size of runs in these rivers.

Pennsylvania AFC-4

David Daniels

\$9,000

Restoration of shad runs in the Brandywine Creek and its tributaries - This is a joint study with the State of Delaware to restore shad runs in Brandywine Creek. Obstructions to upstream movement of fish are being removed, and fertilized shad eggs planted in the stream.

Baitfish:

American Samoa 4-21-D

Stanley N. Swerdloff

\$25,000

Development of natural and captive baitfish stocks - The objectives of this study are to determine relative abundance and seasonal variation of natural bait stocks around Tutuila Island, and to identify and import easily cultured species which have potential as tuna live bait.

Washington 1-81-R

Al Millikan

Completed 1973
\$56,400

Puget Sound baitfish studies - Abundance and distribution of baitfish within Puget Sound were estimated by acoustic gear and survey techniques developed by the University of Washington. The level of effort necessary to monitor the herring stocks was determined also.

Groundfish:

Massachusetts 3-87-R

Phillip G. Coats

\$29,300

Winter flounder investigations - Knowledge of the contributions of estuarine winter flounder to the offshore fishery is needed to effectively manage and regulate this important fishery. Populations of juvenile and subadult flounders will be estimated by mark and recapture methods. Stratified random sampling with an otter trawl and plankton nets will be made in a selected area on Nantucket. Several types of tags for juvenile winter flounder will be evaluated under controlled conditions.

Fishery resource assessment: winter flounder and other species - This study will obtain biostatistical information on the blueback flounder population by monitoring population dynamics of recruiting and post-spawning concentrations in Nantucket Sound. Other inshore fish species will be studied at the same time.

Oregon 1-78-D

Robert L. Demory

\$83,508

Resource survey of the Continental Shelf off Oregon - A resource survey of the Continental Shelf from the Columbia River south to Cape Blanco is undertaken. The first phase of the study will determine abundance of demersal fish occupying the area. The second phase of the study would survey the potential yield of ocean pink shrimp. The information is needed on these resources to negotiate with foreign nationals about stocks outside the 12-mile zone.

Texas 2-221-R

Gary M. Stokes

\$18,000

Life history studies of flounder in Aransas Bay - This project involves study of the life history of and fishery for flounder (Paralichthys lethostigma and P. albigutta) in the vicinity of Aransas, Texas.

Washington 1-70-R

Gene DiDonato

Completed 1971

\$137,540

Monitor conditions of certain groundfish stocks, Washington trawl grounds - Information was obtained on the migration patterns and present status of the principal groundfish species captured by the trawl fleet through a port sampling program, tagging cruises, and intensive studies of the fish stocks.

Washington 1-75-R

Gene DiDonato

Completed 1973

\$273,528

Trawl fishery monitoring and data analysis - This project is a followup of the work carried out under P.L. 88-309 projects 1-22-R and 1-70-R that gathered information on stocks of groundfish. These data are put on computer-oriented storage and retrieval system to ascertain the status of these fish stocks in the trawl fishery and their maximum sustainable yield.

Pacific salmon:

Alaska 5-17-R

Ken Durley

Completed 1971

\$116,500

Pink salmon studies - This study expanded the State's preemergent fry forecast program in the Cook Inlet area for 1 additional year and in the southeastern Alaska area for 2 additional years.

Alaska 5-18-R

Allen Davis

Completed 1971

\$107,700

Sockeye salmon investigations - The magnitude of smolt out-migration from the major sockeye Cook Inlet system and the relationship of this out-migration to the return of the adult were determined. The magnitude and timing of the various stocks of Cook Inlet sockeye salmon were observed also.

Alaska 5-31-R

Alan P. Kingsbury

\$72,000

Study of land use - salmon problems and planning in Southeastern Alaska - The objective is to obtain information on the salmon stocks and physical characteristics of streams in Southeastern Alaska necessary for protection of the stream environment during land use activities, with emphasis on streams where logging is planned.

Alaska AFC-24

James Mauney

Completed 1971

\$107,800

Offshore test fishing - Southeastern Alaska - Offshore fishing was conducted between Yakutat Bay and Dixon Entrance to develop a method for determining abundance of pink salmon shortly before the runs enter the inshore commercial fisheries. Stock identification, timing of runs, and home stream were determined also.

Alaska AFC-25	Allen Davis	Completed 1971 \$4,000
<u>Sonic assessment of salmon escapements</u> - Sonar units were installed and operated in Bristol Bay, Cook Inlet, and Prince William Sound streams to evaluate the counter as a tool for measuring escapement of salmon.		
Alaska AFC-26	Robert C. Lebida	Completed 1973 \$318,000
<u>Yukon River anadromous fish investigations</u> - Work under this project made escapement estimates for king and chum salmon runs and observations on size and age.		
Alaska AFC-27	Roger F. Blackett	Completed 1972 \$212,000
<u>Kodiak sockeye rehabilitation</u> - Project aims were to increase the size of the sockeye salmon runs returning to Kodiak Island spawning system by adult transplants or eyed egg and fry plants.		
Alaska AFC-28	Larry Edfelt	Completed 1973 \$111,300
<u>Alaska Peninsula pink salmon forecast</u> - The objectives of this project were to locate and map the major spawning riffles in the pink salmon streams of the Peninsula.		
Alaska AFC-29	Stanley Moberly	Completed 1971 \$62,800
<u>Sockeye salmon studies - Southeastern Alaska</u> - Collection of biological statistics was continued, and a determination was made of the sockeye salmon producing system in south-eastern Alaska, the size of these stocks, and their racial characteristics.		
Alaska AFC-31	Robert Paulus	Completed 1973 \$114,800
<u>Bristol Bay test fishing</u> - This project provided an estimate of abundance and time of arrival of sockeye salmon bound for Bristol Bay before they enter the commercial fishery after they have been exposed to the Japanese high-seas fishery. It also provided an estimate of the accuracy of forecast and information on size and age composition of the runs 6 to 10 days before they enter the Bristol Bay fishery proper.		
Alaska AFC-32	Peter J. Fridgen	\$99,400
<u>Identification and enumeration of Copper River sockeye salmon stocks</u> - Distribution and magnitude of sockeye salmon escapements are estimated by tag and recovery and by installation of sonar counters on glacial tributaries.		
Alaska AFC-33	Robert Paulus	Completed 1972 \$147,200
<u>Sockeye smolt enumeration study</u> - The Kvichak River produces the world's largest sockeye runs and is the mainstay of the Bristol Bay fishing industry. This project obtained an estimate of smolt production which is basic information on which to make forecasts of returning runs--information which both management and industry use to plan distribution of manpower and money.		
Alaska AFC-34	William Parr	Completed 1973 \$101,100
<u>Species interrelationships in Chignik Lakes</u> - Relationship between young sockeye salmon and resident fish species in Chignik Lakes as they compete for limited space and food was investigated.		
Alaska AFC-35	Ole A. Mathisen	Completed 1971 \$50,000
<u>Carrying capacity of the sockeye salmon nursery areas in the Kvichak district, Bristol Bay, Alaska</u> - The production of juvenile sockeye salmon as a function of large escapements in a continuous time sequence was observed.		

Alaska AFC-40

Fred Bergander

Completed 1974
\$208,600

Southeastern Alaska sockeye salmon optimum escapement studies - Estimates were made of optimum escapements of sockeye salmon in the Chilkat, Chilkoot, and Situk Rivers for development of management techniques for achieving desired escapement goals. Escapements were enumerated for other southeastern sockeye systems also.

Alaska AFC-41

Allen Davis

Completed 1974
\$364,000

Cook Inlet sockeye salmon forecast and optimum escapement studies - Information was obtained on stock size and timing in the catch and escapement for Cook Inlet major sockeye runs. Additionally, magnitude of the smolt migrations from the runs was determined.

Alaska AFC-42

Kenneth Durley

Completed 1974
\$450,000

Alevin abundance - pink salmon prediction studies - The accuracy and quality of forecasts of returning pink salmon runs to southeastern Alaska streams were improved by placing increased emphasis on escapement enumeration, timing of runs, and distribution of spawners within streams. The feasibility of chum salmon forecast was investigated also.

Alaska AFC-43

Lance L. Trasky

Completed 1974
\$87,000

Norton Sound anadromous fish investigation - The objectives of this study were to develop indices of the magnitude of Norton Sound salmon escapements, determine magnitude and effect of local commercial and subsistence harvest on the stocks, and determine distribution and origin of salmon in the Unalakleet commercial fishing area.

Alaska AFC-44

Douglas Eggers

\$6,000

Systems modeling of sockeye salmon in the Wood River Lakes - A systems modeling approach is undertaken to study long-range behavior of sockeye salmon as relates to escapement-return relationship.

Alaska AFC-46

Kenneth Roberson

\$111,200

Copper River commercial fisheries management investigations - The purpose is to develop a method for rapid assessment of escapement levels during the salmon commercial fishing season, and to collect such specific biological data as necessary to ascertain if significant differences can be found between segments of the commercial and subsistence fisheries.

Alaska AFC-47

Lance Trasky

\$100,800

Yukon River king and chum salmon escapement studies - The purpose is to develop estimates or indices on the magnitude of king and chum salmon in the Yukon River system in Alaska and Canada.

Alaska AFC-48

Robert L. Burguer

\$28,650

Chignik sockeye studies - This study continues sampling of juvenile sockeye salmon by means of a tow net fished at night in Chignik and Black Lakes for assessment of parent escapement and juvenile production.

Alaska AFC-49

Phillip Gray

\$28,000

Marked salmon recovery program - This study will determine the incidence of occurrence for marked chinook salmon released in Washington, Oregon, and the Columbia River and of marked coho salmon released from natural and artificial production facilities in southeastern Alaska.

Ocean salmon study - This study is undertaken to investigate ways and means of increasing the ocean salmon catch and to evaluate effects of management programs on the ocean salmon fisheries. Initially, information would be obtained on migration routes of salmon into and out of the fisheries, distribution of sublegal fish, and hooking mortality of sublegal salmon.

Indiana 4-43-R

James J. Barry

Completed 1971
\$36,000

Interspecies relationships of fish in Indiana waters of Lake Michigan - This project was designed to determine how long salmon inhabit the Indiana waters of Lake Michigan and to determine their behavioral pattern with other fish species. Collections of fish were made with gill nets and trawls, and fish were inspected aboard commercial vessels.

Oregon AFC-50

Kirk Beininger

Completed 1973
\$838,738

Improvement of salmon and steelhead trout hatchery techniques - The project provided for research on the biology of hatchery-reared salmon and steelhead trout and for studies for improvement of hatchery procedures and techniques.

Oregon AFC-52

Robert Loeffel

Completed 1973
\$157,200

Management of the troll salmon fishery - This project was essentially a continuation and expansion of the State's ocean salmon fishery research program. Objectives were to compile catch statistics and mark recovery information, follow trends in fishing effort, evaluate the catch, and make final analysis of all data collected to date.

Oregon AFC-54

Wallace Hublon

Completed 1973
\$557,000

Salmon research on coastal streams and reservoirs - This project was undertaken to obtain life history and ecological information for use in programming hatchery operations, predicting and controlling adverse effects of environmental alterations, investigating unused potential and coastal lakes and reservoirs, and measuring the status of coastal stocks of salmon.

Oregon AFC-67

Wallace Hublou

\$232,100

Research on anadromous fishes' coastal watersheds of Oregon - To gather information on salmon (both wild and hatchery reared stocks), shad, and striped bass in coastal rivers, lakes, and estuaries to formulate management policies that will result in a increased contribution of these resources to the commercial and recreational fisheries.

Oregon AFC-72

Paul H. Reed

\$28,000

Coho season evaluation and coded wire tag study - The objectives of this project are to evaluate the effect of changing the California coho season on the coho salmon resource and to obtain information on the contribution of coded wire tagged salmon to Oregon and California. The work will be jointly conducted by the California Department of Fish and Game and the Fish Commission of Oregon.

Washington 1-32-R

Harry Senn

Completed 1971
\$92,500

Hatchery coho salmon--contribution to the fishery - As part of a hatchery evaluation program the Washington Department of Fisheries released fin-clipped smolt coho salmon at 22 hatcheries on tributaries to Puget Sound and Columbia River. Stations participating in the evaluation program marked about 10 percent of their yearling production. Marked adult fish were recaptured at the hatchery racks by the hatchery personnel.

Washington 1-54-R

Ray C. Johnson

Completed 1971
\$38,000

Pink and chum salmon prediction studies - The purpose of this study was to obtain juvenile survival and abundance data to permit adequate testing of experimental techniques used to predict returns to adult pink and chum salmon. The relationship of environmental data of past years to size of corresponding chum salmon runs for the purpose of prediction was evaluated.

Washington 1-55-R

Samuel G. Wright

Transferred to P.L. 89-304

Ocean salmon fisheries sampling - A comprehensive sampling program involving both permanent and temporary samplers at major coastal landing ports was established to monitor pertinent biological factors of Washington ocean salmon fisheries. Sampling included both fish landed at dockside and onboard observations during actual fishing operations.

Washington 1-72-D

Kenneth Kral

Completed 1971
\$45,200

Capital Lake fall chinook rearing program - The means of attaining the maximum fall chinook production and resultant contribution to the fishery from Capital Lake were determined. Natural rearing in the Lake and artificial feeding were evaluated also.

Washington 1-73-D

R.E. Noble

Completed 1971
\$45,000

Hatchery dry feed field tests - This project provided for field tests of dry diets for salmon commercially prepared by different manufacturers to determine feeding parameters tested with the Oregon pellet production diet control. After 1 year the project was transferred to P.L. 89-304 (See AFC-58).

Washington 1-93-D

Ray C. Johnson

\$64,400

Salmon spawning habitat improvement - This project will restore natural spawning habitat by gravel cleaning, streambed control, and gravel replacement in a variety of streams. This project primarily benefits pink and chum salmon in areas where production potential is limited due to natural stream habitat conditions.

Washington 1-96-R

Dave Pratt

\$6,700

Skagit channel, chum evaluation study - The objective is to test the Skagit salmon channel recently completed under P.L. 89-304. This test is intended to evaluate the effectiveness of the channels with respect to chum salmon production.

Washington 1-98-R

Russell Orrell

\$23,600

Skagit chinook race differentiation study - This project will investigate reasons for the changing status in the populations from a decline in the spring and summer chinook stocks to a favorable trend in fall races and to provide improvement in management and increase in production of these important runs.

Washington 1-99-D

Peter Bergman

\$42,000

Salmon fishery systems analysis - A mathematical model will be constructed of the chinook and coho salmon fisheries of the three Pacific coastal States and British Columbia. The model will be of the troll fishery in greater detail than of the other fisheries.

Washington 1-101-R

James W. Wood

\$25,000

Salmonid genetic study - Genetic factors influencing survival, growth, disease, resistance, flesh color, and other conditions directly influencing the economics and productivity of the stocks will be investigated.

Washington AFC-46

Frank Haw

Completed 1973
\$82,240

Puget Sound resident coho study - The purpose of this study was to build up the resident coho salmon stocks in Puget Sound by artificially rearing wild strains of fish that have historically resided within the Sound.

Washington AFC-50

Ernest O. Salo

Completed 1973
\$355,590

Big Beef Creek chum salmon spawning success and fry quality - This project was essentially a continuation of the recently completed project AFC-13 to determine optimum spawning and hatching conditions for chum salmon by use of artificial spawning channels.

Washington AFC-55

Samuel G. Wright

\$69,622

Washington ocean salmon fisheries biological sampling program - The objective of this project is to monitor the commercial and sport salmon fisheries operating from Washington coastal ports for biological and statistical data. This will provide up-to-date information on progress of the fisheries and the primary basis for regulation and management of the resources. The project is a continuation of work carried out as project 1-55-R under P.L. 88-309.

Washington AFC-56

Earle D. Jewell

Completed 1972
\$13,524

1971 Lake Washington sockeye tagging study - Adult Lake Washington sockeye salmon passing through Puget Sound between Discovery Bay and the Ballard Locks were investigated through tag and recovery program. Information was obtained on migration route and rate, marine gill net harvest, and timing of different spawning populations.

Washington AFC-57

Earle D. Jewell

Completed 1972
\$10,498

Puget Sound fall chinook tagging study - This tag and recapture study determined the time of appearance and distribution of the spawning stocks of various hatchery and nonhatchery fall chinook stocks in the fishing area from Discovery Bay to Seattle. Harvest rates by the sport and commercial fisheries were estimated also. This information is needed to develop a rational management and regulation program for the fisheries.

Washington AFC-58

R.T. Noble

Completed 1972
\$21,000

Hatchery dry feed field tests - The project continued research initiated under P.L. 88-309 as project number 1-33-D to evaluate commercially prepared diets for hatchery-reared salmon. Advantages of using dry diets in straight and circular raceways were evaluated.

Washington AFC-61

Peter K. Bergman

Completed 1973
\$244,000

Hatchery chinook contribution to the fisheries - Objectives were to evaluate the effectiveness of hatchery chinook rearing procedures in terms of fishery contribution and to evaluate certain untried procedures to increase hatchery-produced fish to Puget Sound sport fishery.

Washington AFC-62

Ray C. Johnson

\$20,000

Prediction studies, pink and chum salmon - To predict run sizes for Puget Sound and chum salmon, based upon the relationship of samples and observed abundance during early life history phases to subsequent adult returns.

Washington AFC-66

Raymond M. Buckley

\$20,400

Evaluation and coordination of mark and tag recovery study - The purpose of this study is to coordinate the collection and distribution of wire tag and recovery information on salmon stocks and to help other agencies in the development and refinement of data handling and exchange.

Washington AFC-67

Ernest O. Salo

\$104,170

Assessment of production of chum salmon fry from the Big Beef Creek spawning channels - This study is being conducted by the University of Washington at its Big Beef Creek Research Station. Two spawning channels are operated, one for production of chum salmon fry and the other to study the effects of redd superimposition and water velocities on the production of chum salmon fry.

Wisconsin AFC-11

R.C. Lindsay

\$24,866

Evaluation of food processing methods for Great Lakes anadromous fish - This project is for the development of potentially valuable commercial fishery resources through improved quality of Great Lakes salmon and for obtaining information on the channel composition of raw and processed fish, as well as pesticide residues in fish flesh portions. The research is being done at the Department of Food Science, University of Wisconsin.

Scup:

Rhode Island 3-113-R

Richard T. Sisson

Completed 1972
\$36,500

Growth and movement of scup (Stenotomus chrysops) - Information was obtained on movement and migratory behavior of scup marked and released in Narragansett Bay. These data will be correlated with other State programs on this species.

Sea bass:

South Carolina 2-138-R

Charles M. Bearden

Completed 1973
\$16,260

A study on the black sea bass (Centropristes striatus) - Information on the black sea bass, including description of the fishery and biology and general life history of the species, which is essential for development of management procedures of the resources, was obtained.

Smelt:

Wisconsin AFC-10

C.R. Norden

Completed 1971
\$7,874

Age, growth, and maturity of the smelt in Lake Michigan - The age, growth, and maturity of smelt populations along the Wisconsin shore were investigated to determine whether or not there are geographical differences in the growth rates.

Wisconsin AFC-12

C.R. Norden

\$20,800

American smelt and associated species interrelationships in Lake Michigan - This study is undertaken to determine the distribution, food habits, and feeding behavior of smelt and associated species in Lake Michigan adjacent to Milwaukee, Wisconsin. The research will be carried out by the University of Wisconsin - Milwaukee.

Snapper:

Virgin Islands 2-192-R

Joseph R. Sylvester

Completed 1973
\$24,330

Selective life history study of silk and blackfin snapper - The objective of this study was to obtain information on fecundity, growth, sex ratio, and food habits of silk and blackfin snapper--the most abundant species caught in the offshore fisheries.

Striped bass:

Alabama AFC-3

Madison R. Powell

Completed 1973
\$79,600

Striped bass, Morone saxatilis, production to establish commercial stocks in Alabama estuaries - Objective of this work was to culture striped bass fry and fingerlings 6 to 9 inches long in ponds and cages in fresh and brackish water habitat for release into Mobile Bay and contributory streams in an attempt to rehabilitate runs of fish. Results of the stocking of fish were evaluated also.

Alabama AFC-7

E. Wayne Shell

\$70,800

Factors limiting the survival and growth of early life history stages of the striped bass (Morone saxatilis) - The objective of this project is to determine factors that limit the hatchability and survival of eggs and the survival and growth of fry and fingerling striped bass under culture conditions.

Alabama AFCS-6

Madison R. Powell

\$50,000

Striped bass production and stocking experiments in Alabama coastal areas - Hatchery-produced striped bass fry are reared to fingerlings for experimental stocking in coastal streams and for culture in cages in brackish water. Also, experiments are conducted to determine maximum stocking densities in cages and tag loss and fouling characteristics of two types of tags affixed to fish released in coastal streams.

Establishment of a commercial and sport striped bass fishery in coastal streams, estuaries, and open Gulf of Mexico waters - To establish populations of striped bass in Mississippi waters, advanced fingerlings were stocked in coastal streams.

Mississippi AFCS-5

Thomas D. McIlwain

\$70,000

Striped bass rearing and stocking program - To establish a population of South Carolina striped bass in coastal streams, estuaries, and the open Gulf of Mexico waters.

New York AFC-8

Byron Young

\$74,400

A study of striped bass in the marine district of New York - The purpose of this study is to determine the contribution of the Hudson River stocks of striped bass to coastal fisheries and rate of exploitation by sport and commercial fisheries in Long Island Sound, and to collate information relative to commercial landings with that gathered on sport fishery.

Sturgeon:

Iowa 2-156-R

James Mayhew

Completed 1974
\$30,000

Shovelnose sturgeon investigations - This study was made to obtain information on the status of shovelnose sturgeon in the Mississippi River bordering Iowa--Pools 13 and 18--and on the life history of the species. The information will be used for development of a management and regulation program for this resource.

Tuna:

American Samoa 4-22-D

Stanley N. Swerdloff

\$125,000

Further studies of the nearshore tuna resources - This project will investigate the distribution and variations in abundance of skipjack and yellowfin tuna in the nearshore waters of the Island, principally Tutuila Island. Also, studies on effectiveness of various pole-and-line techniques in harvesting these species are continued.

Others:

Alabama 2-120-R

Hugh A. Swingle

Completed 1973
\$50,000

Distribution of commercial fisheries and invertebrates in the tidal rivers of Alabama - This project provided for investigation of the distribution of early life history stages of commercial fishes and abundance and distribution of marsh clams in tidal rivers of Baldwin and Mobile Counties.

California 6-3-R

K.F. Mais

Completed 1974
\$1,269,000

Fisheries resources sea survey - This study was undertaken to determine the total pelagic and bathy-pelagic fishery resources available off the coast of California, and to determine their abundance, degree of utilization, and potential for use.

California 6-16-R

Diane Robbins

Completed 1972
\$5,000

Food habits study of organisms of the California current system - The food habits and requirements of fishes and cephalopods that inhabit the California current system adjacent to the coast were investigated. Stomachs of albacore, bonito, hake, rockfish, and squid were collected for analysis.

California 4-28-D

Kenneth F. Mais

\$143,600

Assessment of commercial fisheries resources - This program is to develop, implement, and carry out surveys and techniques for assessing size, condition, and distribution of pelagic fish populations harvested by commercial fisheries.

Florida AFCS-5

Roy Williams

Completed 1974
\$228,000

Study of anadromous fishes in Florida - This project surveyed about 31 river systems to identify the anadromous fish stocks in each river; obtained basic information on the abundance, seasonal occurrence, and potential level of exploitation.

Louisiana 2-94-R

Fred Dunham

Completed 1972
\$86,000

A study of commercially important estuarine-dependent industrial fishes - Industrial fish populations of coastal Louisiana were investigated to provide information for more effective management and to provide industry with information on how to best utilize these resources.

Mississippi 2-128-R

J.Y. Christmas

Completed 1973
\$93,000

Investigation of coastal pelagic fishes - Seasonal and areal distribution and relative abundance of the larvae, juvenile, and adult pelagic fish species were determined along the coast out to the 50-fathom curve between Mobile Bay and Chandeleur Island. Information was obtained on life history of the species present.

Mississippi 2-215-R

J.Y. Christmas

\$70,000

Fisheries resources assessment and monitoring - This project will provide a continuing source of current estuarine biological and related environmental data required for effective fisheries resources management and the development of new management plans. Sampling will be accomplished at selected locations in Mississippi Sound and adjacent waters.

North Carolina 2-95-R

Maury Wolff

Completed 1971
\$78,840

Scrap fish studies - The effects of commercially harvesting the young of important food fish on future availability of adults of the same species were investigated.

North Carolina AFCS-8

Michael W. Street

Completed 1974
\$460,000

Anadromous fisheries research program, northern coastal region - The anadromous fish stocks of Albemarle Sound and the Outer Banks from Cape Lookout to the Virginia line were surveyed to determine spawning and nursery areas, and growth and migratory behavior. Additionally, information on migratory path and composition of the stocks as they enter and leave the spawning areas was obtained. Offshore work included observation of foreign fishing vessels to determine the species caught.

North Carolina 2-230-R

Walter F. Godwin

\$32,000

Nursery area survey of Northern Pamlico Sound - Project objectives are to locate, define, and delineate nursery areas utilized by economically important species of marine and estuarine finfish and crustaceans; to develop management techniques; and to report on the findings.

North Carolina AFCS-10

Walter F. Godwin

\$64,300

Anadromous fisheries research program - Tar River, Pamlico River, and North Pamlico Sound - This study will determine the spawning and nursery areas of all anadromous species; determine growth and movement of juvenile anadromous fishes; determine age and size composition of commercial and sport harvest; and determine movement, distribution, and utilization of adults within the system.

South Carolina 2-110-R

Charles M. Bearden

Completed 1971
\$11,810

An investigation of the offshore demersal fish resources of South Carolina - Project objectives were to accumulate and evaluate information on the species composition, distribution, availability, and potentials of demersal fish populations of economic significance on the Continental Shelf area off South Carolina.

South Carolina AFC-4

William Wade

Completed 1973
\$130,500

Commercial anadromous fishery - Edisto River, South Carolina - A general inventory was made of the commercial anadromous fish resources of the Edisto, Savannah, Pee Dee, and Waccamaw Rivers.

South Carolina AFG-5

William Wade

\$64,755

Commercial anadromous fishery, Waccamaw and Pee Dee Rivers, South Carolina - This study will obtain catch data from the commercial anadromous fisheries in the Waccamaw and Pee Dee Rivers, determine the present status in those rivers, and obtain biological and economic information for management purposes.

Texas 2-109-R

C.E. Bryan

Completed 1973
\$285,772

Northwestern Gulf of Mexico marine fisheries investigations - study #2 - This work was undertaken to determine the seasonal location, population and size composition, and abundance of the commercial species of reef and mid-water fish and of the commercial shrimp as related to environmental conditions in the northwestern Gulf of Mexico.

Texas 2-231-R

Tom Heffernan

\$150,000

Survey of finfish harvest in Texas Bays - This study will determine the total harvest and catch per unit of effort of commercially important finfish by species, size composition, and method of capture in Galveston Bay, San Antonio Bay, Aransas Bay, and the Upper Laguna Madre and to publish the results in a manner to assist resource managers in regulating the harvest.

Wisconsin 4-58-R

Ronald Poff

Completed 1972
\$75,700

Lakes Michigan and Superior assessment studies - Accumulated data on lake trout and associated species are assembled, compiled, and analyzed as a basis for management of the fishery stocks in Lakes Michigan and Superior.

MARINE WORMS

Maine 3-16-R

Edwin P. Creaser

Completed 1971
\$234,000

Biological, environmental, and technological research on marine worms - Biological studies were conducted on life history, growth, and mortality rates, and predation and distribution of commercial marine worms (bloodworms and sandworms) and other annelid species of potential commercial use. Development of improved methods of harvesting, handling, and shipping was investigated also.

Maine 3-158-R

Edwin P. Creaser

\$38,000

Marine worm research - Catch statistics are collected on the marine worm fishery, and industry-related mortalities in handling of the worms are investigated. Research findings from project 3-16-R are distributed to industry.

SHELLFISH

Clam:

Delaware 3-135-R

Don Maurer

Completed 1973
\$60,000

Hard clam survey of Delaware Bay - Work was conducted by University of Delaware Marine Laboratory to determine distribution, abundance, and condition of hard clams in Delaware Bay. Also, the identity and quantities of invertebrate shellfish predators and fouling organisms were investigated.

Florida 2-134-R

Mark Godcharles

Completed 1972
\$118,100

Exploratory clam survey of estuarine and nearshore waters - The purpose was to survey existing clam populations with the R/V Venus, 68-foot Chesapeake Bay softshell clam dredge, as the main sampling device in the estuaries and to characterize and delimit those with commercial potential.

Louisiana 2-91-R

Johnnie W. Tarver

Completed 1972
\$107,000

A study of the clam, Rangia cuneata, in Lake Pontchartrain and Lake Maurepas, Louisiana - The purpose of this study was to determine the clam shell stocks and rate of replenishment of the clam shells harvested and the factors affecting the distribution, growth, and density of the clam in Lakes Pontchartrain and Maurepas.

Washington 1-42-D

Ronald Westley

Completed 1971
\$125,405

Subtidal hard-shell clam fisheries investigations - Underwater surveys were made to investigate the presence of clams in Puget Sound and the Strait of Juan de Fuca. Commercial quantities have been found in about half of the 41 acres surveyed. Industry, the National Marine Fisheries Service, and the State are cooperating in the development of an efficient harvesting method.

Washington 1-79-D

C. Lynn Goodwin

Completed 1974
\$83,000

Subtidal clam investigation - The project completed a study on the life history of geoduck and on the effects of harvest on the stocks. Additionally, a study of the effects of dredging on hard-shell clam and the environment was made.

Washington 1-90-R

Lynn Goodwin

\$25,000

Study of clam resources and evaluation of harvesting gear - This study is on the hard-shell and geoduck clams to obtain information on reseeding, growth, and clam regeneration. Also the effects of commercial clam harvest on the environment will be evaluated.

Crabs:

Alaska 5-30-R

Nathan P. Johnson

Completed 1972
\$55,700

King crab study - This study was on king crab stocks in the Kodiak area. The relative age class abundance of crabs with particular emphasis on annual recruitment of male crabs was determined, and the allowable quota in advance of the commercial catch was predicted.

Alaska 5-32-R

Daniel Hennick

\$28,100

Cook Inlet king and tanner crab investigations - The principal objective is to develop a method for assessing annual variation in Cook Inlet king crab population abundance and relate this abundance to allowable commercial harvest. Such activity is to develop information on tanner crab at least to the extent where it may lead to a proposal for specific work on the species.

Alaska 5-35-R

William E. Donaldson

\$49,100

Kodiak tanner crab research - The objective is to obtain information on distribution, abundance, migration, growth, mortality, and size and age composition of tanner crab stocks in the Kodiak area.

Louisiana 2-92-R

B.D. Adkins

Completed 1972
\$96,000

A study of the blue crab fishery in Louisiana - The methods for harvesting blue crab commercially, environmental factors affecting annual production, and the economic significance of the fishery were investigated.

Maryland 3-108-R

Stephen D. Sulkin

Completed 1973
\$240,000

Blue crab study in the Chesapeake Bay - This was a joint undertaking by Maryland Department of Chesapeake Bay Affairs and the Virginia Marine Resources Commission to determine how various factors such as fishing pressure, parent stock size, and environmental phenomena influence population size and distribution of blue crab.

Maryland 3-186-R

Stephen D. Sulkin

\$53,184

Factors influencing blue crab population size - This study will investigate the migratory behavior of juvenile blue crab and the relationship between diet and growth of blue crab larvae in State waters of Chesapeake Bay.

Mississippi 2-123-R

J.Y. Christmas

Completed 1973
\$94,500

A study of the blue crab fishery in Mississippi - The life history and dynamics of the blue crab and related species were studied to determine environmental factors influencing the fluctuations of productions. Additionally, the effects of sport-commercial fishery conflicts on the resource were investigated.

Washington 1-52-R

Herb C. Tegelberg

Completed 1971
\$41,000

Dungeness crab study - This project was undertaken to determine the mortality rate of soft-shelled crabs discarded at sea, to develop a method for determining crab quality, to measure crab quality for a 2-year period, and to develop methods for tagging or marking.

Washington 1-76-R

Herb C. Tegelberg

Completed 1973
\$47,000

Dungeness crab study - This project continued the State's effort for development of marking techniques for small crab, improvement in method of handling soft-shell crab and determination of condition of the crab, and obtaining information on feeding habits in the ocean.

Washington 1-92-R

Herb C. Tegelberg

\$25,000

Coastal Dungeness crab study - This study will obtain biological and economic data that will be directly applicable to the coastwide crab management problem.

Lobster:

Connecticut 3-130-R

William Lund, Jr.

Completed 1973
\$74,400

Ecology, population structure, and movement of lobsters - Seasonal composition and distribution of lobster populations in Long Island and Fishers Island Sounds were determined. Information was obtained also on movements, activities, and growth and frequency of molting of lobsters in the study areas.

Connecticut 3-203-R

William Lund, Jr.

\$24,800

Lobster investigations - This study will determine the extent and proportion of inshore and offshore lobster migrations and the degree of intermixing between populations, determine the location and habitat selection of postlarval to juveniles, and continue survey of the extent and types of lobster habitat found in Long Island and Fishers Island Sound.

Maine 3-14-R

James Thomas

Completed 1971
\$309,600

Lobster research program - This study was concerned with obtaining and analyzing biological and statistical data on the inshore fishery for management purposes. Catch statistics from 152 dealers located throughout the coastal counties were analyzed. Samples were also taken each month from 10 different locations along the inshore area to determine changes in length, weight, sex ratio, and maturity of the lobster.

Maine 3-153-R

James Thomas

\$86,500

Lobster research program - Data are collected on the lobster stocks and the fishery in the inshore waters of the Gulf of Maine to estimate the biological minimum size for maximum yield to the fishermen.

New Hampshire 3-155-R

Edward W. Spurr

Completed 1974
\$90,000

Lobster research program - Objectives of the study were to gather statistics on the lobster fishery, obtain information on the species harvested, and determine environmental influences on the catch.

New York 3-100-R

Roy L. Haje

Completed 1974
\$57,500

A study of burrow selection by the American lobster - The behavior of lobster in regard as to the size and shape of the burrow was investigated to obtain information for management of the resource.

New York 3-212-R

Philip T. Briggs

\$34,000

Aspects of the American lobster in Long Island Sound, N.Y. - This study will determine the size of the lobster at maturity and to determine the size composition and sex ratio of lobsters available to and landed by the commercial fishery in Long Island Sound.

Puerto Rico 2-97-R

Robert Y. Ting

Completed 1972
\$63,742

Investigations on the resource potential of the spiny lobster (Panulirus argus Latreille) in Puerto Rico - This project was undertaken to determine the condition of the lobster fishery, determine catch from various fishing grounds, and explore new fishing grounds, especially in depths beyond 20 fathoms.

Rhode Island 3-187-R

Saul B. Saila

\$10,400

Lobster habitat study - The purpose of this study is to evaluate the suitability of a newly designed habitat in several areas of varying distance from shore in both exposed and sheltered environments. Consideration will be given to the effects of temperature, spacing, sediment characteristics, and current flow upon occupancy during the experimental period.

Mussel:

Tennessee 4-46-R

Paul Yokley, Jr.

Completed 1972
\$56,868

Freshwater mussel ecology, Kentucky Lake, Tennessee - This study was designed to evaluate the types of habitat of established mussel beds and to determine the density and species composition of each site. Mussels were tagged, and the shell erosion, age range, number of species, and their density were correlated with the water quality and bottom type of the area.

West Virginia 3-97-R

John M. Bates

Completed 1971
\$61,250

Mussel investigations - This was a coordinated study with Ohio and Pennsylvania to determine the distribution and extent of mussel beds within the Ohio drainages of the respective States. Also, other pertinent life history information such as rate of recruitment, rate of growth, age composition, and reproduction success was investigated.

Oyster:

Delaware 3-142-R

Robert A. Beck

Completed 1974
\$150,000

Live oyster bed and cultch survey of the Delaware Bay and tributaries - This project located, mapped, and marked the distribution of living oyster beds and cultch in the Delaware Bay and its tributaries. Currently, samples of the oyster cultch, plus spat production, were taken to determine condition of the resource.

Florida 2-52-D

Robert M. Ingle

Completed 1971
\$175,090

Construction of artificial oyster reefs - Natural oyster reefs were established from Tampa Bay north to Choctawhatchee Bay. This project will create permanent areas for oyster attachment and growth and, consequently, commercial production.

Artificial oyster reef development - This project provided for planting of about 75 acres with cultch materials annually in Apalachicola Bay, Franklin County, during 3 years for development of permanent oyster reefs. Plants were made in unpolluted areas and near existing oyster producing areas to insure commercial use. Success of the reefs was evaluated on basis of development cost and stability after planting and value to commercial fishermen and the environment.

Hawaii H-13-R

Henry M. Sakuda

Completed 1972
\$65,800

Commercial oyster fishery development investigation - The purpose of this study was to conduct experimental commercial size oyster growing operations with adult, seed, and spat (very young) oysters and investigate methods of producing oysters in commercial quality and quantity for experimental marketing.

Louisiana 2-72-R

Charles J. White

Completed 1971
\$45,000

Evaluation of experimental oyster-tonging reefs in Calcasieu Lake - The purpose of this project was to evaluate the development of oyster-tonging reefs in Calcasieu Lake. About 10,000 to 15,000 cubic yards of clam shell were planted at predetermined locations.

Louisiana 2-90-R

J.F. Pollard

Completed 1972
\$102,000

Experiments to reestablish historical oyster seed grounds and to control the Southern oyster drill - The purpose of this study was to test various materials to determine which is best suited for use as cultch and to determine through cultch plantings which areas are suitable for reestablishing preexisting oyster seed grounds.

Louisiana 2-118-D

J.W. Lay

Completed 1973
\$280,000

Control monuments for oyster leases - The objective of this project was to establish control monuments throughout the oyster growing areas along the coast at $\frac{1}{2}$ -mile spacings on land areas from which surveys of water bottom for oyster leases could be coordinated and identified.

Louisiana 2-209-D

J.W. Lay

\$100,000

Survey stations for oyster leases - This project is to establish control stations throughout the oyster growing areas of coastal Louisiana at $\frac{1}{2}$ -mile spacings on the land from which surveys of waterbottoms for oyster leases can be coordinated as a specific reference point. It is estimated that approximately 900 stations will be required to accomplish this objective.

New Jersey 3-120-D

Joseph Price

Completed 1973
\$305,100

Shell planting program - Seed oysters were moved from Mullica River seed beds to the market oyster beds downstream where they will grow within 2 years to market size. The seed beds were developed by planting of shells under project number 3-1-D.

New Jersey 3-197-D

Harold H. Haskin

\$100,000

Shell planting program - Continue project 3-120-D for an additional 36 months.

South Carolina 2-105-R

Robert C. Gracy

Completed 1972
\$65,000

Survey of the South Carolina oyster fishery - This project provided for an inventory and survey of the State's commercial oyster fishery to provide information that can be used to formulate recommendations for fish legislation and regulation.

South Carolina 2-179-D

Robert C. Gracy

\$53,333

Management and development of the shellfish industry of South Carolina - Oyster harvesting operations, hand and mechanical, are assessed through field observations. Also, management practices are investigated by monitoring results of shell and seed oyster plantings throughout the coastal waters.

Texas 2-218-R

R.P. Hofstetter

\$52,200

Mapping of productive oyster reefs - Galveston Bay, Texas - The objectives of this study are to develop techniques to locate and survey the productive oyster reefs in Galveston Bay, determine their size, and prepare maps and charts showing the location of such reefs.

Virginia 3-179-D

VMRC Staff

\$100,000

Shell planting program - Objectives of this project are to plant oyster shell cultch in several public oyster-growing areas so as to provide an adequate spatfall-collecting medium and to obtain from this spatfall a supply of seed oysters which can be transplanted to rehabilitate the oysters in depleted public oyster grounds.

Virginia 3-193-R

Dexter Haven

\$59,400

An investigation of the seed oyster reserve in Virginia and the testing and modifying of gear to harvest oysters - The objectives identified in the project title will be carried out in the James, Great Wicomico, and Piankatank Rivers by the Virginia Institute of Marine Science.

Washington 1-95-R

Ron Westley

\$15,000

Improved methods of oyster culture and survival study - Objectives are to evaluate methods to increase survival of oyster seed, encourage development of a domestic source, and determine possible application of mechanization in oyster culture.

Scallop:

Alaska 5-23-R

Daniel P. Hennick

Completed 1972
\$99,000

Sea scallop investigations - The objectives of this project were to determine the relative abundance and location of commercially important scallop stocks in coastal areas, to investigate the basic biology of the sea scallop, and to assess damage done to associated species, such as crabs, by scallop dredging.

New York 3-211-R

Donald Zacchea

\$36,200

Rehabilitation of bay scallop fishery of Long Island, N.Y. - The principal objective is to increase the numbers of bay scallops available to the commercial shellfishing industry by transplanting spawning stock into areas which formerly produced large numbers of bay scallops.

Rhode Island 3-162-R

John D. Karlsson

\$37,150

A study of stabilization of natural scallop populations by augmentation with hatchery reared seed - The purpose of this study is to obtain eggs and sperm from conditioned adult scallop, hatch and rear juveniles for release in areas with good potential for successful growth. Transplanted stocks will be monitored for survival, movement, and time and duration of spawning.

Shrimp:

Alabama 2-208-R

Hugh Swingle

\$10,000

Survey of the 16-foot trawl fishery in Alabama - The purpose of this study is to determine the number of 16-foot or smaller shrimp trawls operate in Mobile and Baldwin Counties, and to obtain pertinent information on the fishery to assist the State in the management of this resource.

Alaska 5-25-R

Jerry A. McCrary

Completed 1973
\$92,400

Pandalid shrimp studies - Catch-per-unit-of-effort data collections, stock assessment by seasonal trawl surveys, and life history studies were made on shrimp stocks in the Kodiak-Shumagin-Aleutian areas. Chief effort was around Kodiak Island, the present center of the shrimp industry.

Alaska 5-29-R

Daniel Hennick

Completed 1973
\$28,100

Cook Inlet shellfish investigations - The purpose of this study was to establish an applied research program for Cook Inlet shrimp fisheries. The commercial fishery was closely monitored for obtaining information for management purposes. Additionally, a logbook for collecting data on king crab fisheries was kept for obtaining an index of abundance.

Alaska 5-36-R	Peter B. Jackson	\$92,400
<u>Kodiak pandalid shrimp research</u> - The immediate objective is to obtain information on the post-larval life histories, distribution, and abundance of the major exploited shrimp stocks in the Kodiak area and to determine the effects of fishing on these stocks. The long-range objective is to provide management personnel with data necessary to develop management strategies.		
Florida 2-185-R	Frank Kennedy	\$147,557
<u>Rock shrimp life history studies and exploratory fishing survey</u> - The objectives of this study are to survey the stocks of rock shrimp off Cape Canaveral and define those with economic potential, and to obtain information on the life history, reproductive cycle, and other biological aspects about the species.		
Georgia 2-87-R	Clifford J. Knowlton	Completed 1971 \$39,310
<u>Preliminary studies of a potential finfish industry from commercial shrimp landings</u> - The purpose of this study was to determine the species composition and marketable size of finfish in commercial shrimp catches and their relative abundance during the commercial shrimping season.		
Louisiana 2-93-R	Wilson J. Gaidry	Completed 1972 \$170,000
<u>Investigations of commercially important penaeid shrimp in Louisiana estuaries</u> - Causes of seasonal fluctuations and abundance in shrimp populations in the estuaries were studied to determine how changes in the estuarine environment affect annual and continued production.		
Maine 3-117-R	Ronald G. Rinaldo	Completed 1973 \$96,000
<u>Northern shrimp - assessment of some population parameters</u> - This project was designed to establish shrimp population parameters by sampling and enhancing the collection, catch, and data from survey cruises.		
Maine 3-189-R	Ronald G. Rinaldo	\$38,000
<u>Pandalus borealis - Management modeling</u> - This study is an attempt to build and test a workable population model for relationships between the Gulf of Maine shrimp stocks, the fishery and the environment, and to establish a systematic system of computer data analysis to provide the necessary information.		
Maine 3-202-R	Alden P. Stickney	\$29,000
<u>Environmental physiology of commercial shrimp (Pandalus borealis)</u> - The objectives of this study are to determine the temperature limits for optimum development, to identify those developmental stages which are most susceptible to unfavorable temperatures, and to determine the mechanism or manner in which unfavorable temperatures exert their effect.		
Mississippi 2-124-R	J.Y. Christmas	Completed 1973 \$110,400
<u>Investigation of commercially important penaeid shrimp in Mississippi estuaries</u> - Under this project a study was made of the environmental requirements and relationships of penaeid shrimp with special reference to variations in commercial catch in an attempt to improve predictions of the availability of shrimp to the fishery.		
North Carolina 2-129-R	Connell Furvis	Completed 1972 \$83,000
<u>Studies of commercial penaeid shrimp</u> - This study was undertaken to determine the effect on the resulting commercial catch when precommercial-size pink shrimp are harvested and discarded while fishing for commercial-size brown shrimp.		

Oregon 1-62-R

Robert Loeffel

Completed 1971
\$28,500

An evaluation of methods for determining movements of shrimp - This study was twofold: (1) to evaluate the feasibility of various techniques of determining the movements of Pacific pink shrimp, and (2) to develop holding and rearing techniques of pink shrimp in aquaria.

Texas 2-132-R

Gary M. Stokes

Completed 1972
\$53,647

The population and distribution of penaeid shrimp in Lower Laguna Madre - The purpose of this study was to determine the population and distribution of juvenile penaeid shrimp in Lower Laguna Madre and its watershed with relation to ecological factors, and conduct a brief survey of the bait shrimp fishery in the Lower Laguna Madre in preparation for future studies dealing with the relationships between juvenile production in the Lower Laguna Madre, the bait fishery, and commercial production in the Gulf of Mexico.

Texas 2-202-R

C.E. Bryan

\$88,000

Study of commercial shrimp, rock shrimp and commercial finfish - The objectives are to determine the extent of the spawning grounds, movements and growth rates of white shrimp after they enter the Gulf from the estuaries, and amount and types of finfish captured by the commercial shrimping fleet on the brown shrimp fishing grounds, and delineate the areas of abundance of the rock shrimp and evaluate their fishery potential.

Others:

Alabama 2-201-R

Edgar A. Hughes

\$35,000

Studies of oyster reef cultivation and artificially inducing crab molting - The objectives of this study are to: (1) compare oyster production and cost on cultivated reef plots versus plots which have been planted with shells only; (2) determine the concentration of various hormones required to induce molting of blue crabs; and (3) determine the economic feasibility of producing soft-shell crabs by hormone injection.

New Jersey 3-191-R

A. Bruce Pyle

\$23,796

Shellfish research and inventory - This study is designed to review and evaluate the current shellfish research activities presently being carried out in the State. Reviews will be conducted on oyster research and management and an evaluation of the hard clam transplant and inventory program.

New York 3-116-D

John Hofmann

\$16,800

Shellfish sanitation control - The objective of this project is to permit on-scene microbiological examination of shellfish and water samples, thus avoiding the hazards of interpreting results from samples which have been in refrigerated storage for even a few hours.

New York 3-180-R

John Hofmann

\$16,800

Shellfish sanitation control utilizing a mobile laboratory - This project will conduct sanitary surveys of several small shellfish growing areas, especially those embayments which are difficult or impossible for the water quality group to monitor. The sanitary quality of hard clams as harvested will be determined and related to water quality.

New York 3-196-D

Pieter Van Volkenburgh

\$30,000

Shellfish transplants in the Marine District of New York State - This project is undertaken to remove contaminated shellfish to clean water areas where, after a supervised cleansing period, these shellfish will be available for harvesting and fit for human consumption.

Washington 1-97-R

John Chambers

\$17,500

Puget Sound shrimp and crab management: This study will collect information to determine the present geographical location of harvest within Puget Sound and the extent of catches in each area, both personal use and commercial. Information will be gathered on molting, condition cycles, egg bearing periods, recruitment, and the year to year variation of these factors.

RESOURCE DISASTER PROJECTS

Since 1970 resource disaster funds have been used 5 times. The total amount involved was \$1,763,716.

Alabama 2-165-D

Edwin B. May

Completed 1972
\$70,000

Restoration of an oyster resource destroyed by natural causes - In August 1971 the oyster resource on Point Clear Reef in Mobile Bay became unproductive because of extensive mortality from low oxygen. This project planted 77,500 barrels of cultch material on opposite side of the bay in a suitable and productive area that restored the resource for the same segment of the industry.

Alabama 2-211-D

Edwin B. May

Louisiana 2-213-D

Max W. Summers

Mississippi 2-214-D

William J. Demoran

\$696,016

Restoration of oyster resources lost in a natural disaster - To help restore oyster resources that were damaged or destroyed by excessive flood waters during the winter and spring of 1973. Remedial measure includes the planting of 163,000 cubic yards of shell over 4,132 acres to replace the loss of cultch in Mobile Bay and Mississippi Sound.

Florida 2-167-D

Robert M. Ingle

Completed 1973
\$113,100

Reestablishment of destroyed oyster reefs - When the oyster season opened in September 1971 heavy oyster mortality from fungus was discovered in reefs on east bank of Escambia Bay. This project restored the destroyed resource by constructing about 150 acres of public oyster reefs in new and productive areas in northwest counties.

Maryland 3-214-D

George J. Murphy

Virginia 3-208-D

VMRC Staff

\$806,600

Shellfish emergency rehabilitation program - To help restore oyster resources damaged or destroyed by Tropical Storm Agnes in the spring of 1972. Remedial measures included planting cultch, cleaning old shell beds, and transplant seed and adult oysters. \$150,000 was made available to the Potomac River Fisheries Commission for similar work in the Potomac River.

North Carolina 2-173-D

Fentress H. Munden

Completed 1973
\$80,000

Rehabilitation of oyster grounds damaged by Hurricane Ginger 1971 - To help restore losses caused by Hurricane Ginger in September 1971, 200,000 bushels of shells and marl were planted in Pamlico Sound.

STATISTICS

Thirty-two projects for collection, compilation, and dissemination of fishery statistics have been initiated. Of these, 17 have been completed at a total cost of \$1,397,535 and 15 are at various stages of completion at an estimated total cost of \$664,732.

Alabama 2-238-R

Wayne E. Swingle

\$8,000

Analysis of commercial fisheries catch for Alabama - The objectives of this study are to analyze and summarize data collected by the National Marine Fisheries Service on the annual commercial catch of each species of fish and shellfish landed from each estuarine bay system and from each statistical zone within the Gulf of Mexico.

Alaska 5-27-D

Eldred Butcher

Completed 1973
\$18,400

Expansion of current and development of additional commercial fisheries catches, production, and gear statistics - This project was undertaken to expand collection, compilation, and publication of commercial fishery statistics needed for management of the resources. This involved detailed complete and accurate catch, production, and gear statistics for use by private, State, Federal, and international agencies.

Commercial fisheries statistical systems development - The objectives are to continue the compilation and dissemination of catch and production statistics, and to conduct research into the improvement of the statistics with respect to accuracy and timeliness.

American Samoa H-18-D

Stanley N. Swerdloff

Completed 1972

\$28,000

Statistical analysis of American Samoa's fisheries - Data were collected from the longline fishery for the Honolulu Biological Laboratory of National Marine Fisheries Service, catch reporting systems was implemented for the subsistence fishery in conjunction with a village fishery training program, and the local fisheries were monitored under this project.

American Samoa 4-26-D

Stanley N. Swerdloff

\$12,000

Statistical analysis of American Samoa's fisheries 1974-1976 - The purpose is to collect and analyze catch and effort data of the Samoan-based longline fleet for resource and fleet management policies.

Arkansas 2-157-D

William Bailey

Completed 1974

\$43,500

Commercial fishery industry survey - Statewide inventory was made on the extent and value of the commercial fishery and fish farming industry valued at an estimated \$1 million and \$9 million, respectively. Information obtained would be used in management and regulation of these resources.

California 6-12-D

Richard F.G. Heimann

Completed 1973

\$255,000

Shellfish and bottomfish data analysis - Catch and effort data and research cruise information for crab, shrimp, and bottomfish resources were compiled, machine processed, programmed for computer analysis, and published.

California 4-25-D

John J. Geibel

\$71,500

Commercial fisheries biometrical analysis - This project is to provide analytical, statistical, and computational assistance to commercial fisheries research projects.

Kentucky 2-171-R

Robert Hoyt

Completed 1974

\$10,700

Commercial fisheries investigations of Nolin and Rough River reservoirs - Information was obtained on number of commercial fishermen, record of their harvest, and value of the fisheries on the Nolin and Rough River reservoirs for management purposes.

Maryland 3-198-D

Robert Rubelmann

\$17,100

Implementation of catch records system - This project will complete the development of concepts of a computer-based catch record system. The work which remains to be done to have a complete, documented, and tested computer system for all species and to have the procedures relating to oysters operational for the oyster season.

Massachusetts 3-37-D

Richard W. Beale

Completed 1973

\$134,945

Collection, compilation, evaluation, and dissemination of commercial fisheries statistics - This project provided for new and improved statistics on lobster, alewife, and shellfish fisheries. The landing statistics, including location, catch, effort, and gear for alewife and shellfish, were collected from licensed Massachusetts fishermen and other trawlers. Statistics were compiled, evaluated, and disseminated in monthly bulletins in cooperation with the National Marine Fisheries Service.

Massachusetts 3-194-D

Richard W. Beale

\$29,100

Collection, compilation, evaluation, and dissemination of commercial fisheries statistics - The objective is to develop a complete and accurate commercial fisheries statistical program for all phases of the State's varied commercial fishing enterprises.

Mississippi 2-217-R	Charles H. Lyles	\$14,000
<u>Statistics on subsistence fishing in coastal counties of Mississippi</u> - This study will determine the quantity of fish and shellfish taken by subsistence fishing in coastal waters of Mississippi and to determine the number of subsistence fishermen, the quantity and the dollar investment in gear and equipment.		
Missouri 4-3-R	John W. Robinson	Completed 1972 \$151,557
<u>Research and management of commercial fisheries</u> - This project was carried out on the Mississippi and Missouri Rivers in Missouri to improve the accuracy of commercial fish landings.		
Missouri 2-199-R	John W. Robinson	\$22,466
<u>Research and management of Missouri's commercial fishery resources</u> - Data are compiled from monthly and annual catch of commercial fishermen by gear on the Missouri, Mississippi, and lower St. Francis Rivers. Marketing statistics will be collected on the catch also.		
Nebraska 2-195-R	Monte L. Madsen	Completed 1973 \$11,333
<u>Survey of the commercial fisheries of Nebraska</u> - The objective of this survey was to develop and implement a Statewide statistical reporting system for all commercial fisheries operations, including bait vendors, private hatcheries, and Missouri River commercial fishery. Also, the economic significance of the commercial fishery industries to the State was evaluated.		
Nebraska 2-223-R	Larry Messman	\$9,800
<u>Commercial fisheries statistics</u> - Statistics from various components of the licensed commercial fisheries operations will be compiled from previously developed reporting forms under 2-195-R. These statistics will be compiled and analyzed on an annual basis and results will be used to support recommendations for regulations and control of the commercial fisheries resources.		
New York 3-139-D	Albert C. Jensen	Completed 1972 \$105,000
<u>Commercial fishery statistical program for the State of New York</u> - Commercial fishery statistics were collected for the otter trawl at Greenport, Montauk, and Hampton Bays on Long Island Sound and for the ocean seine fishery on the south shore of Long Island. Additionally, biological data were collected from fish landed. Major species of interest included flounder, scup, hake, striped bass, weakfish, and bluefish.		
Oregon 1-61-R	Wallace Hublou	Completed 1971 \$38,500
<u>Data analysis - Dover sole stocks</u> - Provided for completion of data analysis and submission of reports for publication on Dover sole population dynamics. Also, results of survey of Dover sole stocks in deep coastal waters were distributed.		
Oregon AFC-51	Louis Fredel	Completed 1973 \$200,000
<u>Salmon and steelhead mark processing center for Pacific Coast States</u> - Provided for regional center for processing data obtained from sampling catches and hatchery returns of salmon and steelhead trout and for distribution of landing statistics.		
Puerto Rico 2-182-R	Jose A. Suarez-Caabro	\$86,954
<u>Fisheries statistical program</u> - This project is undertaken to design and establish a fisheries statistics system that, in addition to assisting the local industry, would also provide the statistical needs of the National Marine Fisheries Service and other interested agencies. Statistical landings will include number and types of fishing crafts and number of fishermen.		

South Carolina 2-137-D

Raymond Rhodes

Completed 1974
\$61,000

Development of an expanded commercial fisheries statistics program - This project was undertaken to develop an improved commercial fisheries statistical program through expanded data collection and the establishment of capabilities to process and evaluate these data. The data headquarters was located in Charleston, S.C., and coordinated the program with the Statistics and Market News Division, National Marine Fisheries Service, and the State's Division of Research and Statistical Reports.

South Carolina 2-237-R

Raymond J. Rhodes

\$23,744

Catch and effort data for commercial fisheries in South Carolina - This project will continue the State's collection of catch and effort data of major commercial fisheries. State personnel will assist the National Marine Fisheries Service in the collection of monthly landing data and annual commercial fisheries surveys.

South Dakota 4-18-D

Donald Warnick

Completed 1972
\$88,000

Commercial fishery industry survey - This project provided for the development of a continuous system for the collection of statistics for all commercial fisheries and dealers of fish products in the State.

South Dakota 1-84-D

Donald C. Warnick

\$3,000

Publication of commercial fishing information - Objectives are to prepare and publish bulletin to inform the public of the State's commercial fishery program in management and to publish pertinent findings of a commercial fishing industry survey.

Texas 2-49-R

Claude L. Hamilton, Jr.

Completed 1971
\$67,860

Commercial fishery landings statistical program - study #1 - The National Marine Fisheries Service now gathers and compiles data on shrimp landings, while the Texas Parks and Wildlife Department gathers and tabulates statistical landings of fish, crabs, and oysters. The Department's statistical system from the coastal areas was upgraded so that landing data could be used to interpret research findings and to evaluate management programs.

Texas 2-146-D

Claude L. Hamilton, Jr.

Completed 1974
\$78,740

Commercial fishery landings statistical program - study #2 - This project was the second phase of the State's fisheries program to gather, compile, publish, and make available fishery statistics for fish, crab, and oyster landings from the coastal area.

Texas 2-224-R

Claude Hamilton

\$46,700

Commercial fishery landings statistical program, study #3 - This project is the third phase of the State's fisheries program to gather, compile, publish, and make available fishery statistics for fish, crab, and oyster landings from the coastal area.

Virginia 3-174-D

VMFC Staff

\$9,333

Fisheries statistics and library program - The purpose of this project is to upgrade the reliability of Virginia's fisheries statistics and to catalog such statistics and other statistical information for immediate and meaningful retrieval.

Washington 1-71-R

A. Millikan

Completed 1971
\$14,000

Mid-water trawl fishery data analysis - This project analyzed catch-effort and biological data collected in the 1969-70 hake fishery in Puget Sound, published results of analysis of data collected 1965-69 on the fishery, and analyzed acoustical hake census collected 1969-70.

Washington 1-91-D

Richard Laramie

\$13,600

Salmon habitat data retrieval system - The purpose of this project is to develop a data retrieval system and standardize procedures for handling the tremendous volumes of salmon production and habitat information collected over the past 30 years.

Wisconsin 3-133-R

Willie Fernholz

Completed 1972
\$12,000

Status of fish populations in Pool 7 of the Mississippi River and probable effects of commercial gill net fishery - The purpose was to determine year-class strength of fish species encountered in the Pool 7 gill net catch and relate these data to conditions prior to the closure of the fishery in 1964 as basis for management of the fishery.

PUBLICATIONS*

In carrying out project activities about 300 State scientists are continuously employed to gather information for better management of the fishery resources and to solve fishery problems. These studies have resulted in 398 publications, of which 331 have appeared in scientific journals and 67 have been for partial fulfillment of the requirement for advanced degrees from educational institutions. The literature citations list the project numbers in parentheses followed by the National Technical Information Service (NTIS) accession number.

Paper or microfiche copies of publications and theses resulting from NMFS grant-in-aid projects are available for a fee from NTIS at the address given below:

National Technical Information Service
U.S. Department of Commerce
Springfield, Virginia 22151

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CLARK, JOHN H.

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1974. The mollusk communities of Lake Pontchartrain and Maurepas, Louisiana. La. Wild Life Fish. Comm., Tech. Bull. 10, 13 pp. (La. 2-91-R) COM-74-10734

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- ESPINOSA, F.A., JR., and JAMES E. DEACON
1971. Comparative angler success at Lake Mead (Arizona-Nevada). Prog. Fish-Cult. 33(3): 170-174. (Nev. 6-9-D)

1973. The preference of largemouth bass (Micropterus salmoides Lacépède) for selected bait species under experimental conditions. Trans. Am Fish. Soc., 102(2): 355-362. (Nev. 6-9-D)
- FARMER, PATRICK J.
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- FLICKINGER, STEPHEN A.
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- GAUMER, TOM, DARRELL DEMORY, and LAIMONS OSIS
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- GAUMER, TOM, DARRELL DEMORY, LAIMONS OSIS, and CHARLES WALTERS
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